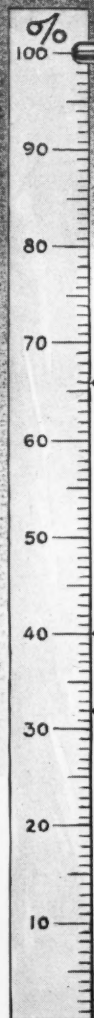
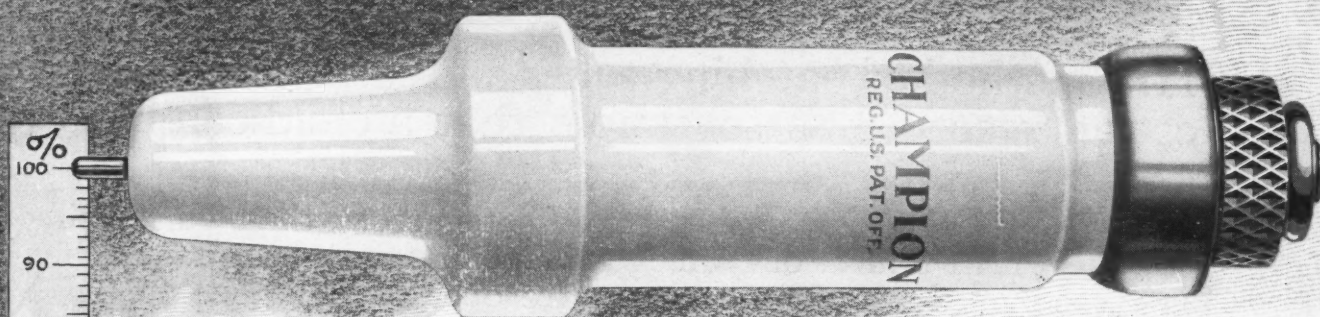


MOTOR AGE

Vol. XXXIII
No. 22

CHICAGO, MAY 30, 1918

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MOTOR AGE

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Vol. XXXIII Chicago, May 30, 1918 No. 22

Contents

FRANCE'S GREATEST AVIATOR.....	5
NO GASOLINE SHORTAGE.....	10
HEADLINERS FOR CHICAGO.....	11
EDITORIAL—THAT GASOLINE BUGBEAR AGAIN	
—LABOR ON THE FARM—WAKE UP, AMERICA!—NEW RAILROAD RATES.....	14
IN MEMORIAM — PAST TRANSPORTATION	
HEROES	15
CAR TAXATION SITUATION.....	16
A. A. A. PLEDGES LIMIT.....	18
WAKE UP, AMERICA!.....	19
MICHIGAN FORDSONS TAMPERED WITH.....	22
TAKING A GYPSY CENSUS.....	24
ELECTRICAL EQUIPMENT OF THE MOTOR CAR	
MOTOR DEVELOPMENT	32
Elcar Sportster, Badger differential, Giles lighting system, Hawkeye truck and Moline Universal tractor described and illustrated.	

DEPARTMENTS

MOTOR CAR REPAIR SHOP.....	39
READERS' CLEARING HOUSE.....	40
ACCESSORY CORNER	44
AMONG THE MAKERS AND DEALERS.....	46
FROM THE FOUR WINDS.....	48

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MOTOR AGE

France's Greatest Aviator— Georges Guynemer

By W. F. Bradley

Motor Age war correspondent at front

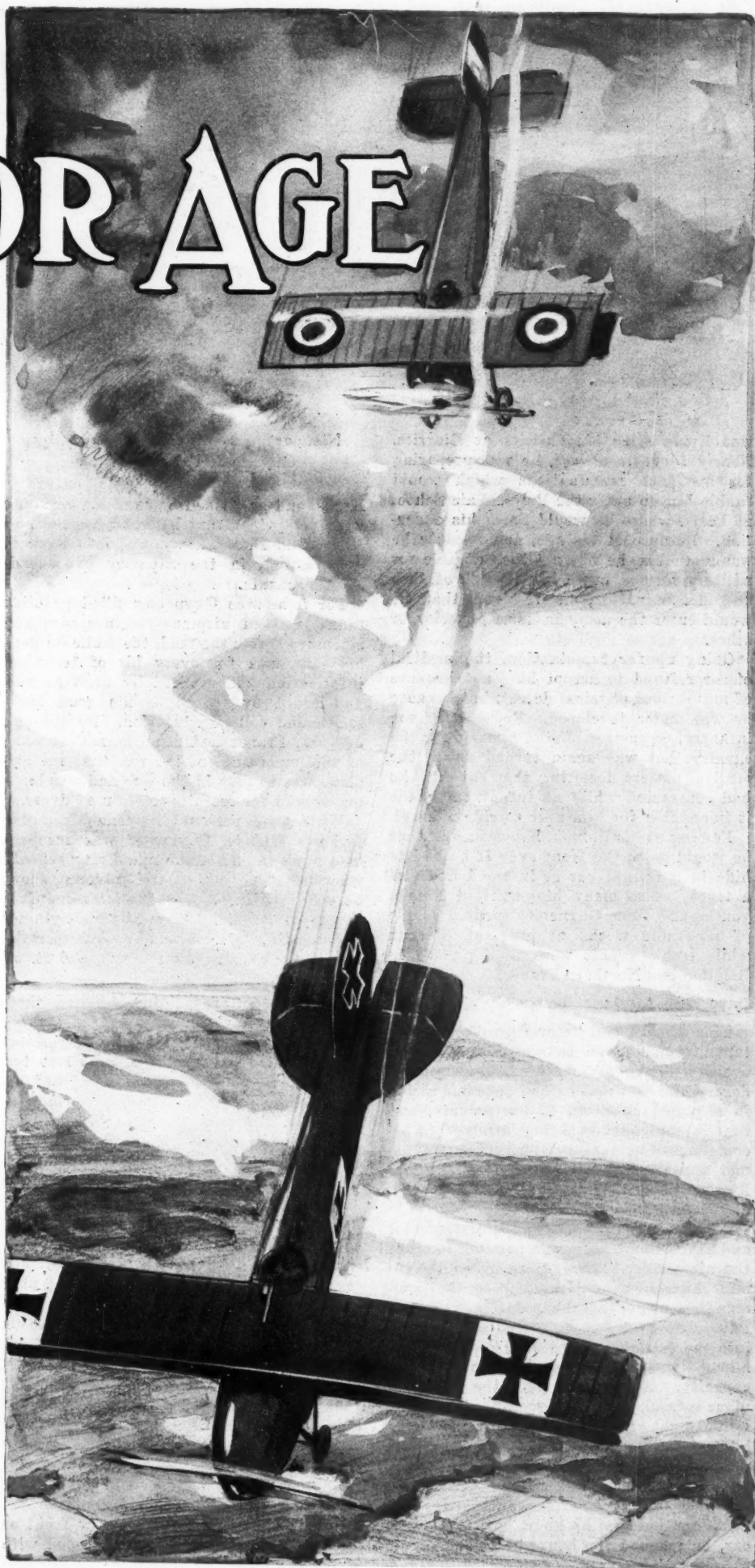
A HIGH-SCHOOL friendship was the starting point of the career of France's greatest aviator, the man who became the terror of German flyers, and who finished his glorious life with the unapproached official record of fifty-three enemy machines completely destroyed and an equal number brought down without official recognition.

Georges Guynemer was a youth of 16 years going through his high-school course at Paris when he met Jean Krebs, son of Colonel Krebs, a director of the Panhard-Levassor Automobile Co., and inventor of the carbureter bearing his name. There was little in the delicate youth reared in the quiet country town of Compiègne under the direct care of loving sisters to indicate that he would shortly become an air pilot of such fame that France would worship his very name. Young Guynemer was rather clever at mathematics and had a love for mechanics, which served as an attachment to Jean Krebs.

France was then throwing as much enthusiasm into budding aviation as she had shown some years before in the debut of the motor car. The annual motor car shows were being held in that magnificent building, the Grand Palais, and it was a part of the school program to take the pupils to these exhibitions on holidays, and also to conduct them through the motor car factories which form a belt around the city of Paris.

These trips were the delight of schoolboy Guynemer, who was always the first to get into the factory and the last to get out. His friendship with young Krebs gave him an advantage not possessed by the other boys, for together they spent a considerable time at the Panhard-Levassor factory, where Guynemer learned to drive cars, and made himself generally acquainted with their construction.

When war broke out, Georges Guynemer





was living with his parents at Biarritz. Nearly 20 years of age, he was preparing for his final examinations which would enable him to enter the Polytechnic School at Paris, where he would finish his education. Because of his age, and because he was a student, he was not then eligible for military service, but being a youth of dash and determination, he resolved that he would enter the army in some capacity or other.

Going up for examination, the medical officer refused to accept him, not because of any serious physical defect, but because he was under developed. Refused for the infantry, Guynemer offered himself for the cavalry, but was again turned down, the medical officers declaring that enteritis he had contracted while an infant had made it impossible for him ever to ride a horse.

Fuming at his ill-luck, but declaring that he would go to the front even if he had to hide in a freight car or in the bottom of a truck, as so many high-spirited French youths had done, Guynemer spent a couple of miserable weeks at peaceful Biarritz while tragic events were taking place in Belgium and Northern France.

Important Airplane Center

This district had become a rather important airplane center by reason of the aerodrome at Pau, only a few miles away; but despite the fact that he had once had a ride in a plane, unknown to his parents, and that in consequence he had resolved to become a professional aviator, young Guynemer appears to have forgotten all his old love until one day a plane capsized when alighting on the beach.

He got into conversation with the pilot and asked him how it was possible to enter the air service. The advice given was to offer himself as a volunteer to the commanding officer of the aviation depot at Pau. The next day he forced an entrance into the captain's office and pleaded to be allowed to serve in the air service in any capacity. Acquainted with the two previous refusals, and not favorably impressed by the sight of this girlish figure, the officer hesitated, then grudgingly admitted that perhaps he might make use of him as a pupil-mechanic.

This was Guynemer's chance. He suddenly remembered he knew how to drive a car, he recalled the hours he had spent in the Panhard-Levassor factory with Jean

Nieuport pursuit plane used by Guynemer for some time

Krebs, and he pushed home this advantage with such vigor that he was accepted and entered the French army, without a medical examination, in the capacity of second-class mechanic.

For 5 months Guynemer filled gasoline tanks, washed airplane engines, dragged machines across the field, the while he kept his ears open for every bit of technical information and profited by what he saw and heard by reason of his good high-school and college education. By the end of 1914, France had come to realize some of the importance of the role that the airplane was to play in the war and was looking around for recruits to train as flyers.

With some personal influence from his father's friends, Guynemer was accepted as a pupil in one of the new flying schools, where after a week's work shoveling snow, he was introduced to a Bleriot monoplane fitted with a 25 hp. Anzani three-cylinder motor, with which it was possible to make hops, but never to get more than 6 ft. off the ground.

The method of training adopted then, and still adhered to, consisted of making the pupil fly alone from the beginning, under the general control of an instructor, who remained on the ground, watched his pupils and corrected and advised them after each trip. The first machine, being underpowered and having clipped wings, could not get off the ground, and was only intended to teach the pupil to travel in a straight line and become familiar with the controls.

The second machine, of similar construction but fitted with a 60-hp. Anzani air-cooled motor, was capable of flying at a speed of about 40 m.p.h., and with this the pilot practiced getting away and making correct landings. Then followed the height test and three cross-country triangles, with a couple of landings on each. After this experience on a slow Bleriot-Anzani the pupil was given a Bleriot machine with a Gnome motor, and if successful on this a Morane-Saulnier or a Nieuport scout.

Guynemer was just 4 months in going through his course of training, at the end of which time he was sent to the front as pilot in a pursuit squadron equipped with Morane-Saulnier — Parasols — monoplanes

with the wings above the fuselage. This squadron later became the famous Group No. 3, known as the "Cigognes," the members of which were cracks, among them being Vedrines, Heurteaux, now in America as instructor, Dorme, De La Tour and Georges Boillot, the famous Peugeot race driver who was killed in an unequal fight with seven German planes.

Although Guynemer entered the squadron with no special reputation, and with only the rank of a corporal, he had shown great promise by the minute care with which he had gone through his training and his unlimited enthusiasm for everything connected with flying. His 6 months as a mechanic had been valuable experience, for they had made him acquainted with the entire construction of engines and planes. He was not content to take a plane which had been prepared by strangers and fly it to the best of his ability; he lived with his machine, verified every detail, and, when weather conditions made flying impossible, would often sit in his machine for hours verifying, experimenting, and thinking out his line of action in aerial combats.

Fights Rare at First

When Guynemer joined his squadron, aerial fights were comparatively rare, for machines had not been designed for specialized uses, and pilots generally were of the opinion that flying risks were sufficiently high without adding to them by fighting one another. Thus the first few months of his service at the front were spent in piloting airplanes for observation work, in which he displayed remarkable coolness under fire. By the middle of 1915, however, the Germans, in retaliation for the bombardments they were suffering, adopted fast scout planes to clear the air of their enemies. The French followed suit and aerial duels became more and more common.

Guynemer brought down his first enemy plane in July, 1915. He was flying at a height of 12,000 ft., in company with an observer, when they decided to attack an Aviatik. The combat, which lasted about 10 min., began at a distance of 150 ft. and toward the end was reduced to 60 ft. During the fight, the machine gun on the French machine became jammed. The observer reached down for his carbide, intending to continue the fight with this weapon, but Guynemer shouted instruc-

tions on how the gun could be made to act, and while the observer was making the adjustment Guynemer kept his plane close behind the German so as to be ready to continue the attack under the best conditions.

About 6 months passed by before Guynemer brought down another German machine. He had been supplied with a Nieuport single-seater, which at that time was the finest scout machine in use by the French army. By this time Guynemer's reputation had been made; he attacked fearlessly at short range and persisted if he did not succeed in bringing down his adversary on the first attempt.

In one fight with an L. V. G. at 10,000 ft., he was only 10 ft. behind his enemy when his machine gun refused to fire. Immediately he dived and banked at the same time, but he was so near that he collided with the enemy; a piece of canvas was torn out of the wing, but the Nieuport was able to land in safety.

It is one of the rules in the Allied services that a pilot shall not be credited with bringing down an enemy unless irrefutable proof is given. On one occasion, while flying very near his own home at Compiègne, Guynemer came in contact with two German machines. After a few minutes fight the first machine was sent spinning down, and convinced that it was completely lost, Guynemer went after the second. The German pilot, however, thought it more prudent to make for home, and being unable to overtake him the Frenchman began a search for his first victim.

Despite a careful inspection from the sky, he was unable to find any trace of the German, but not to be outdone, he landed near his home—it was Sunday midday—found his father, told him what had happened, and asked him to have a thorough search made. The wrecked airplane was discovered before nightfall.

Daring of Guynemer

A fight which took place toward the end of December, 1915, nearly a year after he had been at the front, clearly indicates the daring pilot Guynemer had become. Two Fokker machines were observed. The observer of the first machine was killed at the outset, and the pilot probably losing control of himself, the machine was sent spinning down to earth. The second was a single-seater firing through the propeller, the machine was fast, handy and had a good pilot aboard. The Frenchman and the German closed up to 20 ft.

Guynemer had his machine gun mounted on the top plane and fired by means of a flexible control convenient to his hand. As this control had broken, however, he had to fire with his right hand completely above his head, while controlling his machine with his left hand. In this way he fired 21 shots in 10 sec.

In order to avoid a collision, which seemed inevitable, Guynemer was obliged to rear his machine and literally jump over his enemy, the distance between his wheels and the top plane of the Fokker being not more than a few inches. This appears to have scared the German who made for home, while Guynemer came back with a broken intake pipe, a fractured rocker arm—the engine was a Rhone—several bullets in the engine housing and the propeller, as

well as in the wheels, the fuselage and through one of the elevator control wires.

Guynemer received the Legion d'Honneur on his twenty-first birthday—Christmas Day, 1915. He had already received the Croix de Guerre with four distinguished mentions. The following February the Germans started their formidable offensive at Verdun, with the object of cutting through the French lines and marching on Paris across the Champagne plains.

The enemy had realized the importance of the mastery of the air and had considerably strengthened his fighting squadrons, which were mostly single-seater biplanes with 165 hp. Mercedes fixed-cylinder water-cooled engines. The machines, which were organized in squadrons of eighteen with two to four machines in reserve for each squadron, generally operated in groups of six under the control of a leader.

During the first portion of the Verdun battle the Germans undoubtedly had the superiority in pursuit machines. But the French were quick to reply, one of their actions being the despatch of the Cigogne group of five squadrons of twelve planes each. All these were Nieuport biplanes fitted with rotary air-cooled engines, either Gnome or Le Rhone.

Soon after arriving at Verdun, Guynemer attacked a group of five and dispersed them. A few minutes later he attacked

two other machines. He closed up on the first and opened fire at 30 yd. The enemy replied and Guynemer received a hail of bullets which cut two of the uprights and one of the cables, shattered the windserew, and wounded the pilot above the eye, in the jaw and the cheek.

Blinded with blood, Guynemer made a good landing with the German on his tail, and was immediately moved to a hospital in Paris. While he was under treatment, Georges Boillot, who had been his companion for several months, was brought down with a bullet through the heart while fighting seven Germans in the Verdun district.

Guynemer came out of hospital in time to take part in the Franco-British offensive on the Somme, May and June, 1916. He was then flying a Nieuport biplane, with which he went out every day and frequently was in action several times a day. His method of fighting was then well-developed.

Possessing a machine capable of more than 100 m.p.h. and exceedingly sensitive to its controls, he rushed in close on the enemy's weakest side, but did not open fire until 20 or 30 yd. away. If he missed his objective he counted on his speed and acrobatic agility to relieve him temporarily from the dangerous situation, but after diving, looping the loop, or banking on a wing tip, he came back to the attack and did not abandon the fight until either his enemy had been brought down or he had exhausted his ammunition.

Fight with German

As an instance of the terrifying nature of his impetuous attacks, he once engaged a fight with a two-passenger German plane carrying two machine guns. After the first few shots, the German dived, as if to make an immediate landing; but at the same moment Guynemer's machine gun jammed. Nevertheless he swooped down after the spinning German from a height of 10,000 to 6,000 ft. At this height the German straightened out, and, no more shot being fired, attempted to make for his own lines.

Guynemer then swooped right down on him, as if, in accordance with his usual plan, he was going to get within point blank range and then open fire. The German did not wait for this, but dived again; once more he straightened out, and once more Guynemer swooped down on him. Finally the enemy had to make a landing in the French lines, and while he was on the ground Guynemer made circles a couple of hundred feet above him until the French infantry came up and took the pilot and observer prisoners.

This done, Guynemer landed by the side of the enemy plane and informed his captives, much to their disgust, that he had brought them down with a gun which would not fire. It appeared that Guynemer's first shots had broken the altimeter and revolution counter of the German plane and scared the pilot.

Guynemer himself was brought down on several occasions. After a man has been wounded in the air, it frequently happens that he is a long time regaining his nerve, and during the first few weeks of his return to the front he is at a disadvantage. When Guynemer went back after being in a hospital he attacked an enemy plane in



Captain Georges Guynemer



Georges Guynemer and the "Vieux Charles," his best airplane

his usual manner, but when within range did not open fire.

For 10 min. he stopped in his opponent's line of fire, but did not reply with a single shot. Landing, he declared that he had done this voluntarily, in order to ascertain if his nerve was as good as before his accident.

It was toward the end of 1916 that Guynemer received his best airplane, a Spad fitted with the Hispano-Suiza motor, and having a machine gun firing through the propeller. This machine, christened "Vieux Charles," was more speedy than the Nieuport, its horizontal speed being about 120 m.p.h. It had better climbing ability, could fly higher, and was quicker on its controls. Further, the armament was better, and the position of the machine gun, placed above the motor housing, superior to that of the Nieuport, which had its gun above the top plane.

"Old Charley"

"Old Charley," to Americanize the name of the famous airplane, was in scores of fights; its canvas was shot through and repaired, its spars and propeller were chipped, its engine and tanks were pierced with bullets, but it was carefully repaired and went back into service.

As he became more experienced, Guynemer grew more impetuous, more daring, more determined to bring down Germans. It seemed an inconsistency that this delicately built youth of 21, brought up in refinement and luxury, should become a terrible German slayer, happy only when he was fighting, miserable when the weather or other conditions obliged him to remain on the ground.

The following is typical of his activity: 11:20 a. m., brought down a German in flames; 11:21, enemy plane sent down out of control, passenger killed; 11:25, German down in flames; 11:25½ anti-aircraft shell burst just above the Spad, damaging the

radiator and tearing much of the canvas of the upper plane.

Guynemer was sent spinning down apparently out of control, but at 600 feet from the ground he was able to transform the dive into a glide, struck the ground at 80 m.p.h. and at an angle of 45 deg., the nose of the machine being wedged into the earth like a tent peg. The position was only 100 yd. from the battery which had brought him down.

In the summer of 1917 Guynemer's famous group was moved to the northern end of the line, near Dunkirk. He had hardly reached his new post, when he was obliged to go into hospital. Before he was completely recovered he reported for duty, and as the German tactics had changed, so that enemy machines usually operated in groups of six or seven, he paired with one of his companions, usually Lieut. Deullin or Delorme, though frequently he operated alone.

It was while working with Deullin that he brought down his forty-ninth machine, a 220-hp. Albatross which he picked out of a group of six and sent down in flames after a fight at 10 yd. range. The fiftieth plane constituted a record which a few months before it had appeared impossible to attain.

The actual number of enemy planes destroyed is certainly considerably greater, for unless it was proved that the plane had actually crashed to the ground and been completely destroyed, the case was not allowed by the authorities. Many of the fights taking place over the enemy's lines, and at heights of 10,000 to 15,000 ft., it was frequently impossible to ascertain if what at first appeared to be a giddy fall could not be corrected into a glide with a comparatively normal landing.

Persistent ill luck followed Guynemer during the last few weeks of his life. After bringing down fifty-one machines he

was recommended to retire and occupy himself with the construction of airplanes; further the doctor stated that he was wearing out his nervous system and counseled a complete rest. But the fever of activity burned within him to such an extent that not only did he refuse to go to the rear, but he declined the opportunity given him to rest for a while.

Early in September, Captain Heurteaux, the only man who had any control over impetuous Guynemer, was wounded with an explosive bullet in the thigh and had to be sent to the rear. The day after this loss, Guynemer went out, flew for an hour, caught sight of a German, attacked him at close quarters, then had to let him go because of his machine gun jamming.

Out again, he attacked five single-seaters, but by clever manoueuvering they managed to get away; Guynemer had then been in the air 2½ hr. He went out again, scouring the skies for an enemy machine, and for another 2½ hr. cruised around in the hope of a fight. Total flying for the day 5 hr.

On the last day but one of his life, Guynemer went out three times and three times was obliged to come back owing to some slight accident. He had a Spad machine fitted with two machine guns and driven by a Hispano-Suiza motor. On the first flight his water pump shaft seized, obliging him to make a landing on a Belgian airdrome. While his machine was being prepared, he took Deullin's airplane and with it attacked a group of four Germans.

This time he was hit by four bullets, one of which went through the gasoline pressure pump, obliging him to land immediately and return to his ground by motor car. A few minutes later he was out again on a borrowed machine. The cover of the carburetor float chamber became unscrewed, the gasoline overflowed and the machine took fire. Another forced landing had to be made, although the fire was put out while gliding down.

All this doubtless had an effect on Guynemer's nervous system, for he was unable to support inactivity or non-success. On September 11 he went out alone and never returned. He had come through so many dangers that it was impossible to believe he had succumbed in turn. But when evening passed into night and night passed into morning without the search parties or the telegraph inquiries bringing any news, the fact had to be recognized that he was lost.

Exactly how he was brought down is somewhat obscure. He was buried near the German front line positions, but on the following day the British heavily bombarded this position, then advanced and all trace of grave and airplane was lost forever.

Guynemer's Engine

GEORGES GUYNEMER was the first to admit that his success was primarily due to the men whose machines he flew. He began his fighting career on a Morane-Saulnier Parasol, designed by Engineer Saulnier in conjunction with Aviator Morane, and equipped with the Gnome rotary motor conceived and built by the Seguin Brothers. Later he took the Nieuport bi-

plane, but had his most crowning victories with the Spad biplane driven by a Hispano-Suiza motor.

About 8 years ago Armand Deperdussin picked out an unknown engineer of the name of Bechereau and instructed him to design and build airplanes to be introduced to the world as Deperdussin machines. Bechereau, being an engineer of considerable genius, had no difficulty in producing machines far in advance of anything brought forth up to that time. Deperdussin was a man of remarkable business ability who, with such an engineer as Bechereau, gained a leading position in the French aeronautical world, and made his "Dep" machines famous the world over.

Unfortunately Deperdussin had started his wonderfully successful business career by methods which would not stand the searching gaze of justice, and the outbreak of war found him in prison on charges of forgery and abuse of confidence, while his apparently successful aviation business was brought to a sudden stop.

In ordinary times the Deperdussin business probably would have been scattered to the winds. But France was at war with Germany and could not afford to disband the finest airplane factory in Europe and to lose the services of the best group of airplane engineers. Thus the Deperdussin company became the S. P. A. D. Co. with Engineer Bechereau at its head.

A Romance of War

But the Spad airplane was not complete until it received the Hispano-Suiza engine, and the story of how the engine came into existence is one of the romances of the war. Nearly 20 years ago Marc Birkigt, qualified as a mining engineer in one of the technical schools of Lausanne, Switzerland, accepted an appointment with a mining company near Barcelona, Spain.

Birkigt displayed considerable ingenuity in the designing of special machinery required in the work of the Spanish mines. He had no connection with the motor car industry and was only interested in cars as a user of various European machines which all failed to give satisfaction on the atrocious Spanish roads.

One of the directors of the company suddenly proposed at a board meeting, "Suppose we ask Birkigt to build us an automobile which will stand up under Spanish conditions." Birkigt, consulted on the matter, agreed to build a car, and a series of seven was put down for the use of the directors of the company only. The car proved to be a real success; it was presented to the king of Spain who saw in this private enterprise not only a car which he would like to possess, but the possibility of establishing an important national industry. In consequence a motor car factory was erected at Barcelona and the car was put on the market as the Hispano-Suiza, or, to translate it into English, the Spanish-Swiss.

In 1906 the Hispano-Suiza chassis was exhibited on one of the smallest and most insignificant stands of the elaborate Paris Salon. Perhaps it would have returned across the frontier unnoticed and unappreciated but for the discriminating eye of Charles Faroux, one of the cleverest and

most open-minded of motor car engineers and journalists in France.

Faroux, recognizing in this car the touch of a master mind, sought out Birkigt and convinced him that such a car should be built in France. The consequence was that some abandoned street car sheds in the suburbs of Paris were secured as a factory and the Hispano-Suiza was produced on a small scale on French soil. Faroux, who has always been a strong believer in the value of motor racing, succeeded in interesting Engineer Birkigt in speed contests for cars of limited cylinder capacity. For 2 years the Hispano-Suiza team, with the late Paul Zuccarelli at its head, beat all comers, including Peugeot.

By 1913 the Hispano-Suiza Co. had secured a leading position in Europe and was absolutely swamped with orders, despite the fact that it had abandoned the street car sheds for a modern factory just outside Paris.

Then war broke out. The French government had no need for a car designed by a Swiss, controlled by Spaniards, and built in a Paris factory. With the German armies marching on Paris civilians were not exactly tumbling over one another in their desire to purchase touring cars. Thus, having nothing to do, the factory was closed and Engineer Birkigt returned to

Barcelona to await the end of the war—so he imagined. When the danger of the Germans capturing Paris had been averted, the Gnome company secured a lease on the idle Hispano-Suiza factory and used it for the production of their rotary type motor.

Although the French led the world in aeronautics, the war found them without a single good fixed-cylinder water-cooled aviation motor. The Gnome and Le Rhone, both air-cooled rotaries, were satisfactory up to a certain point; Renault had an air-cooled eight-cylinder which was reliable and limited in power.

And that was all. Before the end of 1914 several Mercedes 6-cylinder water-cooled aviation engines had been captured and were given out to Renault, Lorraine-Dietrich and others to be copied, but to successfully duplicate these engines required almost a year's work.

Having nothing better to do, Birkigt occupied his idle time toward the end of 1914, at Barcelona, in designing a light, fixed cylinder water-cooled aviation engine. The maximum power in any one engine then appeared to be 150 hp. and the eight-cylinders were therefore designed with a bore and stroke of 120 by 140 mm., that is, 4 $\frac{1}{4}$ by 5 $\frac{1}{2}$ in. The first engine built gave such good results that news of it penetrated the

(Concluded on page 25)



Hispano-Suiza engine on test bench on top of the French Alps

No Gasoline Shortage

Surplus Exists and Government Officials Deny Report of Stringent Regulations

Full Power of Country Means Conservation

WASHINGTON, May 27—Reports to the effect that a gasoline shortage prevails are untrue. There is no shortage of transportation. There is a surplus of gasoline.

Tank cars are standing idle in the yards of many gasoline distributors. Reports to the effect that gasoline and kerosene are to be mixed to conserve gasoline and cards are to be issued for the use of gasoline, with motor cars on a ration of 1 gal. a day are labeled by Government officials as propaganda fostered by manufacturers of appliances designed to operate on kerosene or on a limited supply of gasoline.

Government officials do not deny the probability of a gasoline shortage in the future when the Government reaches its maximum power in the war. When many thousands of airplanes, tractors, trucks, tanks and passenger cars are employed, there is no question but that conservation of gasoline must accompany them, but the suggestion of gasoline cards of a ration of 1 gal. a day or a mixture of gasoline and kerosene are unsubstantiated by the facts.

Higher Prices Denounced

Efforts by oil producers to withhold production and increase prices are denounced by M. L. Requa, director of the Oil Division, United States Fuel Administration, in a letter to A. C. Bedford, Petroleum War Service Committee, New York. Mr. Requa states:

"I cannot too strongly emphasize the statement that the Government will not at this time view with approval any further advance in the price of crude oil. Because of the war and the demands that are being made for various essential products it is obvious that the law of supply and demand has broken down.

"Will you, therefore, make it plain to the producers of oil that the Oil Division believes there is no justification for an advance in the price of crude oil at this time and will expect the industry to co-operate with the Oil Division in an endeavor to maintain existing prices as maximum prices.

"Competition in the form of payment of bonus should also be restrained. I do not mean by this that varying prices should not be paid for oils of varying quality, but these differentials once established should not be further advanced.

"I shall be obliged if you will give full publicity to these views and take the matter up with the Advisory Committee on Production, affiliated with your committee, for full consideration and report."

The price of gasoline to the Allies has been fixed by the Fuel Administration as follows:

F.o.b. Gulf ports, 21 cents per gallon.
F.o.b. Atlantic seaboard, 23½ cents per gallon.

United States Navy specifications apply in both instances.

Prices of aviation naphtha are fixed as follows:

F.o.b. Gulf ports, 30 cents per gallon.
F.o.b. Atlantic seaboard, 32 cents per gallon.

British specifications 302 deg. Fahr. final boiling point apply in both cases.

Prices of fuel oil for the Allies were fixed as follows:

F.o.b. Gulf ports, 5½ cents per gallon by British Admiralty specifications; 5¼ cents per gallon by United States Navy specifications.

F.o.b. Atlantic seaboard, 7½ cents per gallon by United States Navy specifications.

Prices of standard white kerosene were fixed at:

F.o.b. Gulf ports, 7½ cents per gallon.
F.o.b. Atlantic seaboard, 8¼ cents per gallon.

Mexican reduced oil was fixed at 6 cents per gallon, Atlantic seaboard.

These prices became effective May 20 for sixty days.

The House of Representatives has passed the oil leasing bill designed to open up more than 6,000,000 acres of Government oil lands in the West to meet the requirements of the Army and Navy and for other war purposes. The bill allows the Government to lease one man 560 acres of Government oil land or not more than 5600 acres to a corporation. The Government will receive an eighth of the oil obtained.

The bill further settles the difficulties between Western oil men and the Government over the closing up of reserve lands by the Navy and Department of Interior, by allowing operators on Government land whose wells were closed by Government action nine years ago to continue their work under the royalty-leasing plan of the bill. Under the old plan the operators took the oil free from the Government land.

More Aerial Mail

WASHINGTON, May 24—The Postoffice Department has planned extensions of the airplane mail service, and mail-carrying airplanes will operate between New York and Boston next fall. A third route will be established later between Chicago and St. Louis. The planes already have been purchased for the New York-Boston route. Schedules will be operated between New York and Boston in conjunction with the Washington-New York route and will effect a saving of 4 hr. in mail delivery as compared with railroads.

Postoffice officials are confident that the aerial service will be self-sustaining. Under the present arrangement, the War Department furnishes the fliers and machines and pays the cost of upkeep. The Postoffice supplies the landing fields and gasoline. To date, an average of 600 letters had been carried northbound between Washington and New York, bringing in \$150 a day. Southbound receipts are slightly less.

Late Air Development

Military Affairs Committee Refuses to Allow Hughes Free Hand in Investigation

Postal Service Uses Liberty Engines Now

WASHINGTON, May 25—The Military Affairs Committee of the Senate has declined to comply with the request of Charles E. Hughes that he be given a free hand in the aircraft investigation. Five senators forming a sub-committee will conduct an independent inquiry into airplane production, including causes of delay and insufficient production, which is claimed.

Senator Thomas of Colorado will head the sub-committee and confer with Mr. Hughes to-day to convince him that the committee's investigation will not interfere with that of the Department of Justice. Others on the committee include Senators Reed, Smith, Neu and Frelinghusen.

The Senate committee takes the position that its investigation in conjunction with the Department of Justice opens two distinct lines of inquiry. The Department of Justice is investigating to determine if laws have been violated and if there is ground for civil or criminal action. The Senate committee believes that it should inquire into production, for the reasons of delay and other inefficiency in office, which it claims will not be touched by Mr. Hughes.

Arguments for Decision

Senator Thomas told the committee yesterday that Secretary Baker stated no objection to the committee investigation, and this had considerable weight for the committee.

Another argument advanced in favor of a continuance of investigation was that the Department of Justice inquiry will necessarily be secret until Mr. Hughes has filed a final report, probably three months hence. Meanwhile a Congressional inquiry, it is intended, will reveal obstacles to production and point the way to frame remedies.

The general staff officers of the Army are perfecting the organization details of the new Aeronautics Division formed by the recent Presidential proclamation. Secretary Baker states that many of the officers attached to the Signal Corps will be transferred to the new organization and identified by a new insignia yet to be designed. The Division of Aeronautics will have entire charge of flying at the battle front. It will train and designate pilots who are to fly balloons and airplanes and will take over all the flying camps in this country.

A large seaplane equipped with two Liberty engines flew from Philadelphia to Hampton Roads May 20 in 3 hr. 15 min. The plane carried five passengers, including the pilot. It was manufactured at the Naval aircraft factory in Philadelphia.

Liberty engine-equipped airplanes used Thursday for the first time in the postal air service established new flying records. Mail which left Washington at 11:30 a. m. arrived in New York at 2:10 p. m., better-

ing previous records by 40 min. The journey from New York to Philadelphia was accomplished in 52 min., beating previous records 23 min. The journey from Washington to Philadelphia was made in 1 hr. 48 min.

A statement from the Signal Corps to the Senate showing all aviation expenditures, gives total appropriations of \$749,886,000 and excess contract authorizations and expenditures amount to \$157,453,000. Engines, airplanes, parts, etc., amount to \$229,000,000 under the fixed price contract and \$334,000,000 under the cost-plus plan. Construction work came to \$53,000,000 under the fixed contract; balloon division \$16,000,000 under the fixed contract; schools, experiments, etc., \$850,000; pay and expenses \$14,000,000, and seat coast and equipment, including insular possessions, \$40,000,000.

The total reported of contracts made was \$556,478,000 under the fixed price system and \$350,860,000 under the cost-plus-profit plan.

The Army appropriation bill submitted to the House of Representatives Saturday calls for \$990,250,812 for aviation, not including several hundred thousands to be expended for machine guns and other munitions for the airplanes, bringing the total well over \$1,000,000,000. An additional \$75,550,000 is asked for armored motor cars above the \$272,522,550 already authorized.

The Senate Military Affairs Committee, reporting on the bill, showed that the United States now has 1316 airplanes in France, 323 of which are combat planes. There are 3760 military airplanes at twenty-seven camps in this country. The aviation section of the Signal Corps has 12,167 officers and 126,761 enlisted men.

U. S. MAY REPAIR ROADS

Washington, May 24—Representative Cooper of Ohio has introduced a bill in the House of Representatives to provide a Federal appropriation of \$10,000,000 for use in repairing roads over which there has been heavy travel and which have become impaired by extraordinary use by the Government. State highway commissions would apply for relief to the Secretary of Agriculture, and provision would be made for the necessary repairs when approved by him. The bill has been referred to the House Committee on Roads.

BUDGET OF STEEL NEEDS SOON

Washington, May 24—An estimate of the steel production of the United States for the year and the budget of war needs for the Government is being prepared by the War Industries Board. It will be completed early in July. No curtailment of so-called non-war production will be ordered until this budget is finished and the exact requirements are known.

Steel manufacturers demanded this budget when asked by the Government to curtail steel shipments to non-war industries. Steel makers are confident that their plants can more than meet the war requirements and for that reason asked for the budget.

Headliners for Chicago

Resta, Chevrolet and Mulford Sign Up for 100-Mile Handicap June 22

Ability and Speed Are the Basis of Allowances

CHICAGO, May 27—Resta, Chevrolet and Mulford are the headliners so far now for the 100-mile handicap on the Chicago speedway June 22. These three have signed entry blanks, and it is anticipated that a sufficient number of other drivers to make a good meet will be obtained as soon as the Sheephead Bay event Memorial Day is over. Resta was the racing champion for 1915 and 1916 and Chevrolet held that title last year by common consent. It is expected that Chevrolet's mount will be one of the Frontenacs, while Resta is believed to have a dark horse in the shape of a new engine which was designed and built last year during his temporary retirement from racing.

A novelty for the Chicago speedway is the handicap feature. Allowances will be computed according to the speed of the cars and ability of the drivers as shown by past performances, with the idea of bringing the contestants as nearly as possible together at the finish of the 100-mile grind.

Card for May 30

New York, May 27—The card for the Decoration Day meet at Sheephead Bay Speedway has not yet been definitely settled though it is certain that there will be two events and perhaps more. The principal feature will be the 100-mile Harkness Trophy handicap, for which sixteen entries already have been made. The other event will be a 10-mile handicap, which is to be run in two heats and a final. Entries formally close at noon May 28. Both races are for non-stock cars of 300-cu. in. piston displacement or less. The entries to date are:

DRIVER AND CAR	HANDICAP
Louis Chevrolet, Frontenac.....	Scratch
Ralph de Palma, Packard.....	1:01
Dario Resta, Resta Special.....	2:02
Ralph Mulford, Frontenac.....	2:05
Barney Oldfield, Golden Submarine.....	2:10
Eddie Hearne, Duesenberg.....	2:12
Tom Milton, Duesenberg.....	2:15
Ira Vail, Hudson.....	2:21
Omar Toft, Miller Special.....	2:35
Not named, Delage.....	2:50
Not named, Delage.....	3:00
Denny Hickey, Hotchkiss.....	3:10
I. P. Fetterman, Peerless.....	4:00
Percy Ford, not named.....	5:00
Rudolph Wehr, Wehr Special.....	6:00
William Votere, Duesenberg.....	6:00

The car which Resta will drive is a combination of the Peugeot chassis which he has previously driven fitted with an engine which he is understood to have built himself. For the 10-mile handicap, de Palma and Resta will be on scratch.

H. L. HORNING RESIGNS

Washington, May 24—H. L. Horning, director of the automotive products section of the War Industries Board, Council of National Defense, has resigned. His resignation was accepted for the War Industries

Board by George M. Peek, director of finished products. Mr. Horning is secretary of the Waukesha Motor Co., Waukesha, Wis., and imperative need for his services at home led him to resign to give his entire time to his personal business affairs. He came to Washington in May, 1917, as a member of the automotive committee of the Council. He has been actively interested in the design and production of standardized war trucks against which serious opposition developed through objection to this program on the part of certain interests.

In July, 1917, he was made chairman of the automotive committee and has held that position ever since. His duties have been the final supervision of purchases by the allies of the United States Government of all automotive products, including passenger cars, motorcycles, motorcycle sidecars, motor ambulances, trucks, truck bodies, truck tractors, truck trailers, armored cars, military tractors, military tanks, airplane engines, machine gas engine, stationary gas engines and automotive accessories.

GIRL TO LEAVE CAPITAL

Washington, May 27—The resignation of Christian Girl, director of production, Motor Transport Section, was accepted Saturday. Mr. Girl, who has been trying to get an acceptance of his resignation for several weeks, will leave Washington May 29 for Cleveland, where he will resume his duties as president of the Standard Parts Co. As was told in an earlier issue, Mr. Girl filed his resignation last January, when he foresaw that his work would be completed by May 1.

The retirement of Mr. Girl and H. L. Horning, whose resignation was announced, marks the completion of exceedingly important war work. The pooling of all designing, engineering and purchase of motor trucks, which both men have urged for months, was effected by the recently announced pooling order from the general staff. The additional orders just placed for the Class B standardized war truck proves the worthiness of both the truck and standardization. In addition, while there has been no official announcement, it is known that in tests held last week the A and AA standardized trucks, as well as the B, displayed remarkable powers, being either equal or better than trucks with which they competed, both in low fuel consumption and climbing and tractive ability. In consequence of the tests, it is anticipated that all three of the standardized trucks will be utilized widely in military service, and with the knowledge of work well done, both in the co-ordination of all truck activities and the completion of worthy standardized trucks, Mr. Girl and Mr. Horning leave Washington satisfied with their accomplishments.

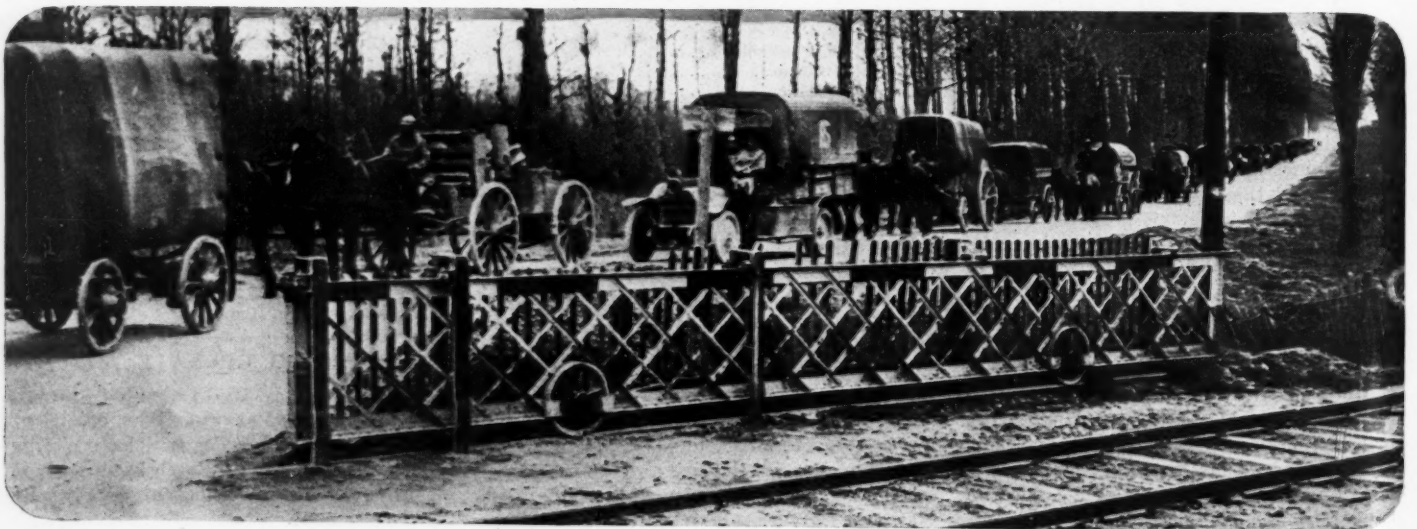
MURRAY TO OPERATE BOSCH

New York, May 25—Arthur T. Murray, from Allentown, Pa., who is an official of the Bethlehem Motor Co., will have charge of the operation of the Bosch Magneto Co., recently taken over as alien property by the Government.

MAKING HISTORY IN WAR-RACKED PIC- ARDY WITH ARMY MOTORS

Effective work is done by the immense observation balloons in detecting the enemy's movements and directing the aim of the cannon of the army. This photograph shows how the balloon operates from a motor truck, which is used to transport the balloon from place to place. A special truck is used for this work. The balloon pictured here is engaged in guarding Paris

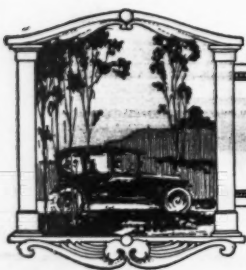
American and French motors both are shown in the lower photograph, which is one of the early ones of the Picardy battle to be received in this country. The convoy is hurrying along a road to the front to take supplies to the troops engaged in the great engagement. In this connection it is quickly recalled that it was to a similar line of trucks that credit for the saving of Verdun and Paris is given



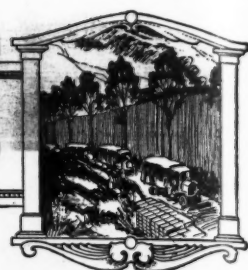


Above is shown the first plane used by American aviators in France as members of the United States army. At the right French and British soldiers are being refreshed just prior to entering the front lines to oppose the German drive in the great battle of Picardy. The terrace of cannon below exhibits an unusual type of motorized cannon that is being used with telling effect against the Germans by the French troops on the plains of Picardy. Note the camouflage





EDITORIAL PERSPECTIVES



That Gasoline Bugbear Again

ON other pages in this issue MOTOR AGE again is called on to deny widespread rumors as to an alleged shortage of gasoline. This is not the first time there has been such a universal spread of exaggerated, to say the least, stories as to what the American motorist is going to, and must, do without. First, the public was told that gasoline cards were to be issued. Then it learned that each of the some four or five million motorists in the country was to be put on a niggardly ration of 1 gal. of gasoline a day. Also motorists were to be compelled to run their cars on a mixture of half-and-half gasoline and kerosene. None of these restrictions is at all likely to come about at any time in the immediate future, according to careful investigation at Washington among Government officials.

THERE is no shortage of gasoline in this country. There is no shortage of gasoline transportation. It is not to be expected for one moment that this implies a shortage of gasoline in the future is impossible or improbable. Such a shortage, is possible—in the future when our Government reaches its maximum power in war strength and corresponding war needs. The Big Drive to Victory will take many thousands of airplanes, tanks, passenger cars, tractors and trucks, and for all these much gasoline is necessary. At the peak of their need there is little, if any, question as to the necessity of conservation of gasoline. But gasoline cars and rations of 1 gal. a day and half-and-half mixtures are other matters than those for consideration to-day.

Labor on the Farm

IT is estimated that in spite of the care given to the problem as much as 20 per cent of the farm labor of the country will have been absorbed in the drafts, including those of April and May. The effect of this cannot be realized to its fullest without personal touch with the farms this labor has left for the defense of the country. The situation was serious enough before the May draft. The scarcity in farm labor has brought about a competition that has resulted in prices that make it unnecessary for a certain class of farm labor to work in order to live with, what is for it, extravagant ease. The farmer must turn more and more to motor labor to make up this deficit.

will await more leisure for baling. The same car incidently serves that farmer for the necessary trip for repair parts for his "other" farm machinery from nearby towns and does the household marketing, besides a score of other chores the familiar horse and wagon or horse and buggy never got around to doing.



IN the great cotton, corn and alfalfa region of the Mississippi Valley negro labor is not to be had even at \$2 and \$2.50 a day. White labor just does not exist in sufficient quantity. If this condition is not relieved before another rain the cotton will be hopeless, much of the hay will be lost, the weeds will take the corn. One farmer in mind solved the problem by harvesting his hay with his passenger car. He used the car to cut the hay, to rake the hay and to haul the hay to the barn, where it



FARMERS who never worked before on Sunday are plowing on Sunday now. They have to, because they have to do most of the plowing themselves. They can't get the labor to do it for them. What this points to as the inevitable result is increased power farming. And it should be the result. To the Nation's army belongs all the fighting material that possibly can be spared from the ranks of the supporters of that army. While the time is about here when all who will not work voluntarily will be made to do so, and there will be some means of obtaining to its fullest the labor that does remain, even this will not solve the problem. The farm is in for motorization, and judging from all the earmarks the farmer will not be happy until he gets it.

Wake Up, America!

THAT our Government would permit the transportation of much needed supplies to be held up day after day when these supplies had been started on their way to the ports of shipment seems unthinkable. Were these supplies halted on the road by men, directly, it is certain that swift action against them would be taken, as it has been taken against other men who have aided the enemy.

YET, it is just this condition that confronts the overland shipments of motor trucks and the hundreds of tons of badly needed supplies and nothing is being done about it. R. H. Johnston in the article headed "Wake Up, America!" tells how our war work is being criminally delayed by the condition of some of the roads of highest military importance—road conditions of which the remedy is easy and quick.

New Railroad Rates

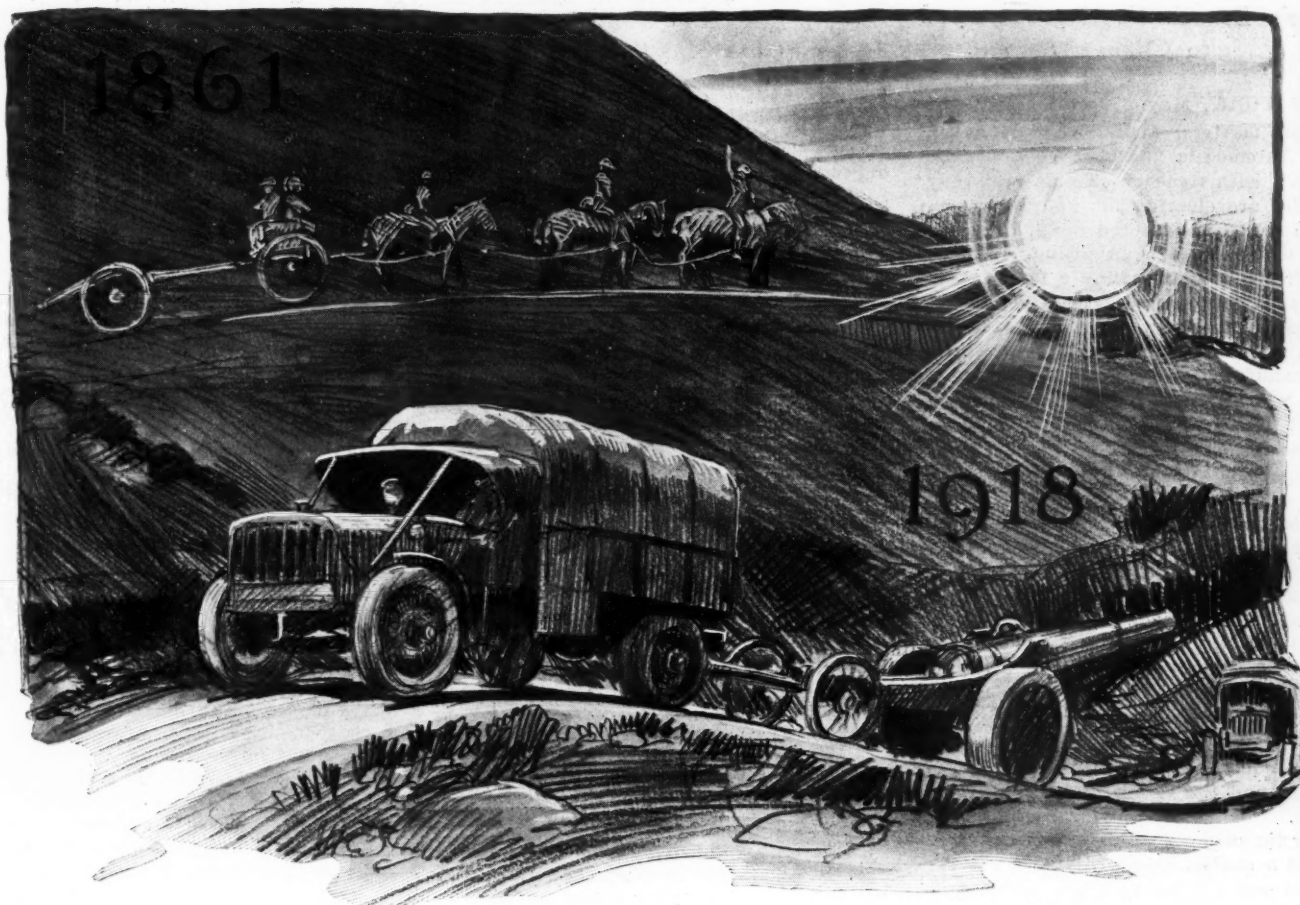
THE higher railroad tariffs which are soon to go into effect are certain to render the motor truck and the passenger car proportionately more economical by comparison. So far as the passenger vehicles are concerned, the number of classes of work in which transportation by motor vehicle over the road will prove less costly per dollar of business done than travel by steam vehicle over rails is bound to be greatly increased. The traveling sales-

man and others whose business requires travel will find in greater numbers that with the reduced train schedules and the higher rates the cost of commercial transport by rail will be increased. In the same way, but to a greater extent probably, will the motor truck be affected by the new freight rates. Many of the present classes of work, in which freight shipment by rail is cheaper, will transfer to the classes in which motor transportation is cheaper.

In Memoriam—Past Transportation Heroes

By Darwin S. Hatch

Editor Motor Age



MEMORIAL DAY, recalling the heroes of other wars in the midst of this greatest of all wars, cannot but emphasize how greatly war has changed. Chiefly, this change is evidenced, and has come about, through the substitution of mechanical for animal and human power. It is through the motorization of war that the greatest change has been wrought. The cavalry of 1861, whose chief duty it was to keep an eye on the movements of the enemy, becomes the swift scout plane of 1918; the courier of 1861, dashing in to headquarters on his foam-flecked mount with news from the front, to-day is replaced by the motorcycle rider where telephone and wireless will not suffice.



BUT it is in the province of the army mule of Civil War days that the greatest transformation has taken place. The monster field guns of to-day have been made possible by motor tractors which can haul loads impossible to their long-eared forerunners.

The vast aggregations of men at long distances from their bases are made possible only by motor trucks which can transport them and keep them supplied with food and ammunition. The quick movements which infrequently have characterized the present conflict have been the work of motor trucks.



SOME have lamented that the reduction of warfare to a highly scientific use of mechanics and chemistry would take all the glamor out of war—that the day of heroic deeds passed with the prancing charger and the flashing saber. No one who reads of the man-to-man combats of the air fighters, the intrepidity of the tank crews, the bravery in the face of unknown dangers of those who man the submarines, the daring of the truck and ambulance drivers on shell-strewn roads can doubt that the heroes of the present will be sung as have those of the past, if in different terms.

In memory of the heroes of 1861, let us stand behind the heroes of 1918.

Car Taxation Situation

N. A. C. C. Conference with Treasury Officials may Bring Ruling in Two Weeks

Maker's Branch Footing Expected to Change

NEW YORK, May 25—Motor car taxation matters, about which the National Automobile Chamber of Commerce conferred with treasury officials yesterday, gradually are clearing up, and though no definite ruling is expected for at least two weeks, the situation is promising.

Under the original ruling a manufacturer's branch was held to be separate and as such was required to pay a tax of 3 per cent on the retail value of cars sold, whereas a manufacturer selling that car to a dealer, who in turn sold it at retail, was required to pay 3 per cent only on the price to the dealer. It is expected that this will be straightened out and that the manufacturer's branch selling at retail will be placed on the same footing as a dealer.

Another matter which was discussed was the tax on a tax. Under the original ruling a manufacturer who sold a car to a dealer at wholesale for \$800, for example, the dealer's tax in this case being 3 per cent, or \$24, was required to make a return to the Government on both the price of the car to the dealer, \$800, and the \$24 tax. In other words, his return was on \$824. It has been pointed out that this is manifestly unfair, and the ruling probably will be changed.

Under the original ruling a manufacturer who sold a chassis direct to a user was required to pay a 3 per cent tax, whereas if he sold the chassis to a dealer, the dealer was required to pay a 3 per cent tax on the chassis and also on the value of any body applied to it. It is considered likely that this ruling will be changed so that a manufacturer will pay a tax of 3 per cent on the chassis regardless of the person to whom it is sold. The dealer probably will pay 3 per cent only on the value of the body applied to the chassis.

When parts were exported and assembled abroad, no tax was levied on the cost of the parts, under the old ruling. Under a recent decision of the supreme court, however, this ruling has been suspended temporarily pending a review of the situation. It may be that exporters of dissembled cars will be required to pay a 3 per cent tax.

PHILADELPHIA TRUCK EXCHANGE

Philadelphia, Pa., May 24—To increase the efficiency of operators engaged in long-distance motor truck transportation, the board of trade, through its committee on inland transportation, is seeking to form a motor truck exchange in this city. It is planned to consolidate and stabilize the operation of motor trucks through organization, which would guarantee the responsibility of all members in such a body. Long-distance trucking concerns are organizing here almost weekly. Motor truck men have expressed the view that thoroughly com-

petent operators are necessary, especially now that the Government is making a survey with a view to establishing a Federal department of highways, that, under a chief like Mr. McAdoo, would have jurisdiction over the building and control of roads.

Tentative plans of a proposed system of motor truck highways in Southeastern Pennsylvania have been submitted to Joseph N. Hunter, acting state highway commissioner. The project was indorsed recently by the city comprehensive plans committee and financial aid from the state will be required to put it into effect. The highways are planned to connect industrial centers within a radius of 60 miles of Philadelphia, obviating the necessity of having much of this traffic pass through the city.

WEEK'S PRICE CHANGES

Chicago, May 27—The Mitchell Motors Co., Inc., Racine, Wis., has announced the following price changes, effective June 1:

D-40 Series

MODEL	OLD PRICE	NEW PRICE
Two-passenger roadster	\$1,250	\$1,350
Five-passenger touring	1,250	1,350
Five-passenger touring with detachable top only	1,550	1,550
Coupe	1,850	1,900
Sedan	1,950	2,000

C-42 Series

Three-passenger roadster	1,490	1,565
Five-passenger club	1,560	1,625
Seven-passenger touring	1,525	1,625
Four-passenger surrey	1,625	1,700
Seven-passenger touring with detachable top only	1,825	1,825
Cabriolet	1,960	2,035
Coupe	2,135	2,210
Club sedan	2,185	2,260
De Luxe sedan	2,425	2,525
Sedan touring	2,275	2,375
Limousine	2,850	2,850
Town car	2,850	2,850

Prices on all Chandler models increased May 25 \$200. The touring car and roadster which were \$1,595 are now \$1,795.

Prices on all models of Moline-Knight, except the sedan, have increased \$100. The touring car which was \$1,650 is now \$1,750, on the small chassis, and from \$1,985 to \$2,085 on the larger one.

Prices of the Elgin touring car and roadster increased \$70 May 24, making the new price on these \$1,165. The Military Scout four-passenger model, recently announced, remains \$1,195.

Prices on Nash passenger cars and trucks will advance June 1, and will be as follows:

Five-passenger touring	\$1,395
Seven-passenger touring	1,545
Four-passenger roadster	1,395
Six-passenger sedan	2,085
Four-passenger coupe	2,085
1-ton chassis	1,595
2-ton chassis	2,075
Nash Quad chassis	3,250

The coupe and seven-passenger touring car are new models. The roadster and five-passenger, however, are increased \$100. The price of the Nash Quad chassis also remains the same.

HAYES RESIGNS PRESIDENCY

Chicago, May 28—Charles M. Hayes has resigned as president of the Chicago Motor Club. His presidency of many years has been somewhat a stormy one. His successor has not been announced.

8000 Class B Ordered

Motor Transportation Service Places New Contracts at \$567 Per Motor Truck

Seventy-five Is Daily Production at Present Time

WASHINGTON, May 25—Orders for 8000 Class B 3-ton standardized motor trucks have been placed by the Motor Transport Service. They will be distributed through the various branches of the Army as required. Each company awarded a contract will do assembly work, the parts having been ordered from other concerns, and will receive an assembly price of \$567 per truck. Deliveries are to be completed between Aug. 1 and Dec. 1. Sixteen companies are expected to share the order, of which fifteen already have signed contracts. They are:

Gramm-Bernstein Motor Truck Co., Lima, Ohio.
 Kelly-Springfield Motor Truck Co., Springfield, Ohio.
 Indiana Truck Corp., Marion, Ind.
 Service Motor Truck Co., Wabash, Ind.
 Republic Motor Truck Co., Alma, Mich.
 Selden Truck Co., Rochester, N. Y.
 Bethlehem Motor Corp., Allentown, Pa.
 Diamond T Motor Co., Chicago.
 United States Motor Truck Co., Cincinnati, Ohio.
 Brockway Motor Truck Co., Cortland, N. Y.
 Healy Motor Corp., Moline, Ill.
 Sterling Motor Truck Co., Milwaukee, Wis.
 Garford Motor Truck Co., Lima, Ohio.
 Packard Motor Truck Co., Detroit.
 Hurlbert Motor Truck Co., New York.

Price Is Lower

Ten thousand of the Class B trucks already have been ordered. More than 2500 have been delivered, and seventy-five are being produced daily. The assembly price of \$567 per truck is approximately \$200 lower than the assembly price of between \$700 and \$800 which was reported for the first contract of 10,000 trucks. These contracts are awarded as a result of the work of Christian Girl, director of standardized truck production, and Col. C. B. Drake of the Motor Transport Section, which is now joined to the Motor Transport Service of the Army by the recently-announced pooling orders.

GARMENT MEN PLAN TRUCK ROUTE

Washington, May 17—The Waist and Dress Mfgs. Assn., Philadelphia, will organize a line of motor trucks to operate daily between Philadelphia and New York. The Philadelphia manufacturers ship large quantities to New York daily and receive correspondingly large quantities of materials from that city. It is proposed that when this line is established it will be used on the order of return loads bureau carrying merchandise to New York and hauling other merchandise back to Philadelphia. The truck line when it is established, will be advertised among the New York trade to the effect that deliveries can be made on certain daily schedules from Philadelphia. George W. Haney, president of the association, is promoting the motor truck plan.

National Flag Day

Friday, June 14, will be the national Flag Day.

On that date every factory in the country is expected to have a flag-raising ceremony for a period of half an hour during the noon period. If the factory has not a flag pole it should have one erected before that date. The ceremony should be started by raising the American flag at that time. There should be some 4-min. speeches, some shorter talks and other ceremonies as might suit the occasion.

The object of Flag Day is to increase the spirit of Americanism throughout the workers of a nation. It is intended to afford an opportunity of giving a better conception of what Americanism means.

There are in this country to-day approximately 3,000,000 foreign-born white persons who do not speak the English language. These people cannot be reached except through foreign tongues, through foreign publications, through foreign organizations.

In addition there are in America 13,000,000 foreign-born people. There are in America 33,000,000 people born of foreign population.

These figures give some conception of how necessary it is to push forward what is known as the Americanization movement in America. Heretofore, we have been content to designate America as the melting pot of the world in which we imagined all foreign citizens resident in this country were gradually and surely being changed into one type of American personality. While this

has been true with great numbers unfortunately it has not been true with many, perhaps millions.

It is opportune that Americanization should take a foremost position to-day because of the propaganda which German influence is spreading throughout our wage earners. Approximately \$50,000,000 per year is being extended in this country among wage earners, which is resulting in reduced efficiency of labor.

Efficiency Necessary

In war the highest efficiency of labor is necessary. The efficiency of the worker must be higher in war times than in peace times. While wages with many workers have been increased 50 per cent in the last year, the efficiency of the worker has not increased. One chain of factories reports that its labor efficiency per individual is 10 per cent lower than a year ago. In this factory the percentage of absentees, men not at work, although not sick, is 15 per cent of the total payroll. The labor turnover is 45 per cent per month. These are examples of inefficiency in war times and suggest the necessity for accomplishing something which will increase labor efficiency.

Teaching of the English language in factories increases labor efficiency. One New York factory which employs foreign-speaking people has found its efficiency increased 25 per cent by having the workers taught English. Not only is the efficiency increased, but the number of accidents is reduced. The amount of re-

jected material is also reduced.

Flag Day affords a good opportunity of starting Americanization in your factory. It is not necessary to have persons in your employ who cannot speak our language. Supposing you have, then they should be taught the language. You should arrange to start educational courses to accomplish this end.

Supposing everyone in your factory can speak the language, then it is still necessary that you carry on an Americanization movement. You may buy castings or steel forgings or stampings or parts from factories in which the workers nearly all speak foreign languages and cannot speak our language. It is of direct interest to you that all those workers learn our language. It will make those products that you purchase from such a factory cheaper. It will make it easier for you to do business. It will be helping the cause.

Whether you are a manufacturer or a dealer or a garageman or a repairman or the president of a motor club or of a motor car dealers' association, have a flag-raising ceremony June 14. If the premises permit, erect a flag pole and carry on the performance to the best of your ability. If you cannot have a flag pole then have some ceremony that will convey the same spirit to the workers. Get the message of Americanization and its imperative importance at this time into the minds and hearts of your complete organization.

SALES PROBLEMS OF THE WAR

Detroit, May 25—Lee Anderson, vice-president of the Hupp Motor Car Corp., addressed the Detroit Section of the Society of Automotive Engineers at its meeting last night on the problems of the sales and engineering departments during the war and afterward. Mr. Anderson spoke extensively on the problems of distribution which now have to be met and the benefits which would result from complete co-operation between the engineering and sales departments.

J. Edward Schipper, technical editor of *Automobile Industries*, was elected chairman of the section; A. C. Hamilton, chief

engineer of the Oakland Motor Car Co., vice-chairman; Charles Van Sicklen of the Van Sicklen Speedmeter Co., secretary; Don T. Hastings, chief engineer of the Holley Carburetor Co., treasurer; and R. E. Wells, engineer of the Hyatt Roller Bearing Co., member of the national nominating committee.

KLAXON ABSORBS STENTOR

Newark, N. J., May 24—The Klaxon Co. has absorbed the Stentor Electric Mfg. Co., Long Island City, N. Y. The Autophone and the other instruments formerly made by the Stentor company will be marketed by the Klaxon sales organization.

SHOW PALACE STILL AVAILABLE

New York, May 24—The annual national motor car show in New York will not be affected by the reported change in control of the Grand Central Palace. The Palace is owned by the New York Central Railroad and is leased for fifty years to the Manufacturers' and Merchants' Exchange. The DuPonts have bought a controlling interest in the company, but so far as that part of the building used for exhibitions is concerned no changes are contemplated. E. V. P. Ritter will continue as managing director and Charles E. Spratt as manager of the furniture exchange. The show will not be affected.

A. A. A. Pledges Limit

Fighting Spirit Indicates Influence Devoted to Vigorous Pursuit of War

ATLANTIC CITY, N. J., MAY 24.—“I pledge the resources of the American Automobile Association to the limit so far as its influence can be used in the vigorous pursuit of the war. This is no time to talk about our rights or our likes as citizens, but to talk about our duty. Never again will I buy goods that are made in Germany, and never again will I buy merchandise from a distributor whom I know handles German goods.”

This extract from the address of David Jameson, the newly-elected president of the American Automobile Association, at its annual meeting held here to-day shows the fighting spirit within those who are to guide the destinies of the association for the next twelve months. Mr. Jameson, who succeeds Dr. H. M. Rowe, of Baltimore, Md., who has held the presidency for two years, is a banker of Newcastle, Pa., and a man who has been particularly active in the Pennsylvania Motor Federation, which is affiliated with the A. A. A. Not only has Dr. Jameson outlined his war policy for this year, but he also announced to-day that, being a business man engaged in banking, he is going to improve in every way he finds possible the business affairs of the association.

Eddie Rickenbacher, the racing driver, was unusually honored to-day when he was elected a life member of the A. A. A. because of the excellent patriotic and war spirit he has shown first by going to France and serving as a driver for General Pershing and then by taking the aviation course, which has brought him so successfully up to the present with at least two and probably more German planes to his credit. Not only was a cable sent to Rickenbacher to-day advising him of the honor, but the signatures of all delegates attending the convention were sent to him.

To Develop Motor Truck

Judging from the speeches and addresses of to-day the activities of the A. A. A. this year will be devoted more largely to the development of the motor truck in national commerce and in war work. Heretofore the association largely has had to do with the passenger car field, although during the last year the association, through its Washington office, has furnished a great deal of road information and maps for those departments having motor trucks driven overland from the factory to seaport. The movement for a greater concentration of the activities of the association on commercial vehicle matters was analyzed by David Beecroft, directing editor of the Class Journal Co., who took the stand that as 80 per cent of the war really is made up of industry, it would follow that the majority of the activities of the association should be devoted to this work. The A. A. A. should aim to place itself in a similar position with regard to commercial transportation over the highways that it now occupies with passenger travel over the highways.

It was recommended that perhaps a special board of the association take this matter in charge, but the resolutions committee voted that the actual handling of the activity be referred to a committee to be appointed by President Jameson, who is instructed to confer with the motor truck committee of the National Automobile Chamber of Commerce as to the best method of handling this new phase of the association's activities.

Mr. Beecroft recommended many activities that such a highway transportation board could work upon. It would be possible to co-operate with such recent highway activities as: Overland delivery of motor trucks; return-load movement; rural express; long-distance inter-city haulage; store-door delivery; congestion at railroad terminals; snow removal; coal distribution from cer-

tain mines not served by railroads; and the development of the motor truck for all incoming and outgoing freight within a radius of 25 miles of the large cities.

Many new activities for such a board were suggested, among which might be mentioned: Research on snow removal and the publication of a monograph covering this and intended for general distribution; survey of highways especially needed for motor truck transportation with a view to seeing that bridges along such are adequate and that all connecting links between states are of modern construction and that the entire usefulness of the road is not interfered with. State investigations could be started, showing the amount of traffic over different highways. Existing motor clubs could be urged to take up this work.

In the election the following vice-presidents were elected: Hon. Clifford Ireland, Congressman from Illinois; R. W. Smith, Denver, Col.; P. J. Walker, San Francisco, Cal.; H. J. Clark, Minneapolis, Minn.; Preston Belvin, Richmond, Va.; Dr. R. R. Elmore, Louisville, Ky.; and J. H. Quayle, of Ohio.

Attitude Toward Roads

The attitude of the association with regard to permanent road building suitable for motor truck work and general war time conditions is shown in the resolutions adopted which are as follows:

1—Because our highways are an essential part of our transportation system the War Industries Board should be urged to place road-building material and road-building machinery on the priorities list.

2—That the several committees of the War Industries Board having jurisdiction over the issue of new securities and approval of bond issues for improving main highways approve without delay all of such matters.

3—That as properly constructed and maintained highways are vital to our national needs that the following road-building is deemed best:

(a) Roads and bridges should be so built and maintained that they will withstand the constantly increasing heavy motor truck traffic.

(b) Roads and bridges should be built wider than they have been in the past so that they can accommodate both the slow moving freight traffic and the faster moving passenger traffic.

(3) Moneys received under the Federal Aid Road Act, as well as moneys received from state and rural sources should be applied first to connecting the larger centers of population by main trunk highways.

(d) These main trunk highways should be continued to state boundary lines so as to link up with adjoining states for interstate traffic.

(e) The policy of snow removal should be encouraged.

(f) The greater share of the Nation's transportation being placed upon the highways calls for greater Federal, state and county appropriations.

4—Intercity highways for commercial traffic should be well signboarded.

5—The patrol system of road maintenance should be universally adopted.

6—Because of the shortage of motor mechanics the motoring public should drive its own cars as much as possible. The motor clubs should take up work of training motor mechanics.

7—All motorists should give soldiers and sailors a lift whenever possible.

Wake Up, America!



Truck load of acetylene gas cylinders, upset by caved road on its way to shipyards

WAKE up, America!

If bands of armed men in the employ of Germany were roving the main highways of the country, and were holding up for hours at a time motor trucks loaded with war supplies and food supplies, would there not be a furor! The President would send a special message to Congress; Congress would immediately enact some emergency legislation and the entire resources of the country would be pledged to a suppression of such outrages.

What are the facts? Trucks loaded with food and munitions, in transit between our principal cities, are being held up every day for hours at a time and are being seriously damaged. These hold-ups, however, are not due to the forces of General Hindenburg, but are caused by General Neglect. Although the disastrous results to the war program are the same, no one in high authority seems at all concerned and each day conditions grow worse and hold-ups increase in number and in duration.

For example, the main highway between Baltimore and Philadelphia, running through our most important ship-building and munition-making section, is in disgraceful condition, particularly that portion of the highway which lies within the state of Delaware. The Maryland portion of the highway is in fairly good condition, but few motor trucks can make the trip between Baltimore and Philadelphia without being held up somewhere in the state of Delaware, either by being mired or by breaking some part.

I have recently made two trips over this road and each time I have seen twenty or thirty trucks broken down or stuck in the mud on the 30-mile stretch running north and

By R. H. Johnston

R. H. Johnston is a pioneer motorist and president of the Mudlarks, a group of motorists who were in the New York-Pittsburgh endurance run of 1903—Editor

south through the state of Delaware. In general, the roads through Delaware are of two general classes—first, roads which become so soft every time it rains that motor trucks sink in to their axles and, secondly, old macadam roads which are so rough and so full of holes that no vehicle can pass over them without receiving a terrible shaking up. The most discouraging phase of the situation is that only in one or two very limited sections are there any signs of any intention to repair the roads.

Let me give a typical illustration of the way these disgraceful road conditions affect our war preparations. On one of our recent trips we saw a 5-ton truck which had become hopelessly mired at one side of the road. This truck had turned toward the side of the road to allow another truck to go by and the side of the road had caved in,

allowing the truck to slip into the ditch at the side of the road.

This truck was loaded with cylinders of acetylene gas for welding purposes, which had been sent from a plant in Maryland on a "hurry call" to a ship-building plant near Philadelphia. When we saw the truck it had been there for 18 hours. There is no doubt that in the meantime important operations in the ship-yard were being held up owing to the non-receipt of the acetylene tanks. The accompanying photograph tells the story. When this accident happened it had not rained for nearly a week. Imagine what the conditions are after a heavy rainfall!

A few days ago I read that "motor trucks were racing from Baltimore," carrying to New York some refrigerating machinery to replace machinery which had been destroyed by fire in a great cold storage plant which was filled with perishable food for our army. I am very certain that the machinery did not reach New York at the time it was expected, and quite probably not until all the food in the warehouse had spoiled.

It was bad enough in times of peace that the main highways connecting our principal seaboard cities should have been in poor condition. To put the case mildly, it is certainly "giving aid and comfort to the enemy" that, in time of war, one of our most important inter-city highways should be allowed to become almost impassable for motor trucks. What are our public authorities doing to remedy these conditions? Almost the only official announcement I have seen in reference to our highways was the order issued last fall placing road-building material and road-building machinery in



Good roads at Port Chester, Conn.



Delaware roads that are sadly delaying our war shipments—They could be made excellent all the year round if a little of the most necessary work were put on them now

the non-essential class with pianos and talking machines. The words "highway improvement" are seldom heard in Congress or in executive circles in Washington.

While the state of Delaware probably has the worst highway system in the country, judged from the point of view of the importance of good roads as a part of the war program, this state is by no means the only offender. That part of the Lincoln Highway which goes through the state of New Jersey is, in many sections, in a wretched condition and is rapidly growing worse. In previous articles I have pointed out how the state of Pennsylvania has neglected its road system between Beaver Falls and the Ohio state line, and I have also pointed out how New York state has never thought it worth while to build a good road from Buffalo to the Pennsylvania state line.

The excuses for the condition of the highways given in each locality where the roads are in bad condition is that "motor trucks are breaking down the roads." The various highway departments seem to regard this as the last word on the subject except that, in New York, the Highway Commission had the happy idea of meeting the situation by attempting to bar heavy trucks from the public highways. This latter legislative proposal almost became a law and undoubtedly would have done so had it not been for the vigilance of the several dealers' and motor truck organizations.

Not Properly Built

To say that the roads are bad because motor trucks have been passing over them is simply a confession that the roads are not properly built and maintained. It is perfectly possible to build roads which will stand up under the heaviest motor truck traffic, as the state of Connecticut has amply proved. In fact, no words of praise can overstate the fine work which Connecticut has done in building and maintaining its main highways.

For example, there is not even a "bump" on the road between Bridgeport and the New York state line near Portchester, and there are few roads in the country which have heavier traffic than this road. This stretch of road between Bridgeport and Portchester is happily not an exception but is quite typical of all the main highways of the state. For example, starting at Winsted, in the northwest corner of the state, there is a fine highway down through the Naugatuck Valley, passing through Torrington, Thomaston, Waterbury, Naugatuck, Ansonia and Derby, and right down to Bridgeport.

In all of these towns, there are important munition plants and almost every plant has a fleet of motor trucks making daily trips down the Naugatuck Valley and thence to New York. There is also a perfect road from Hartford to New Haven. Finally, Connecticut is to be especially commended in that it has carried its fine roads right to the state line instead of stopping the work at the last important town within the state, as is the unfortunate method in Pennsylvania, Ohio, and New York.

The shore road through Connecticut, which starts at the New York state line, is improved and is kept in condition every

foot of the way to the Rhode Island state line, despite the fact that there is no important town on this highway east of New London. Similarly, the state has improved the road running north from Hartford right up to the Massachusetts state line. In fact, Connecticut has had the vision of the state being a part of the nation and has carried on its road development with due regard to the traffic to and from other states.

As a result of this fine development in the state of Connecticut, every manufacturing plant in the state is served by the highways. The motor trucks which run from the Connecticut plants to New York City can be run on a definite schedule, and the manufacturer can dispatch his goods in his motor truck without worrying whether or not his truck will be mired or jolted to pieces before it gets to its destination.

Connecticut has furnished the example. It has shown that roads can be built which will stand the heaviest motor truck traffic. More than that, it has adopted the policy of removing snow from its highways in the winter so that it gets the use of them for twelve months of the year.

Let no more be said about motor trucks "breaking down the roads." Let this excuse no longer be offered in explanation of disgraceful road conditions. Nor should the states, in my judgment, wait for the Federal Government to come and fix their roads. Local initiative and local responsibility should not be supplanted by centralized national inertia.

"Aid to Enemy"

If the several states, such as Delaware, containing great munition and ship-building plants, cannot be made to see the economic gains which accrue through having highways of the Connecticut standard, probably the officials of these states can be influenced by the patriotic argument that, to neglect the roads and to let them fall into a state of disrepair, is exactly the equivalent of giving aid to Germany.

The part which the national Government should play in the road-building program is immediately to class road-building as a preferred industry to be especially favored in every way and to be classed in national importance with shipbuilding and railroad maintenance, particularly during the continuance of this "war based on transportation."

Coming back to the picture which is impressed on my mind of the truck sunk in up to the axles on the main highway between Baltimore and Philadelphia, I am inclined to revise the old adage so that it will read:

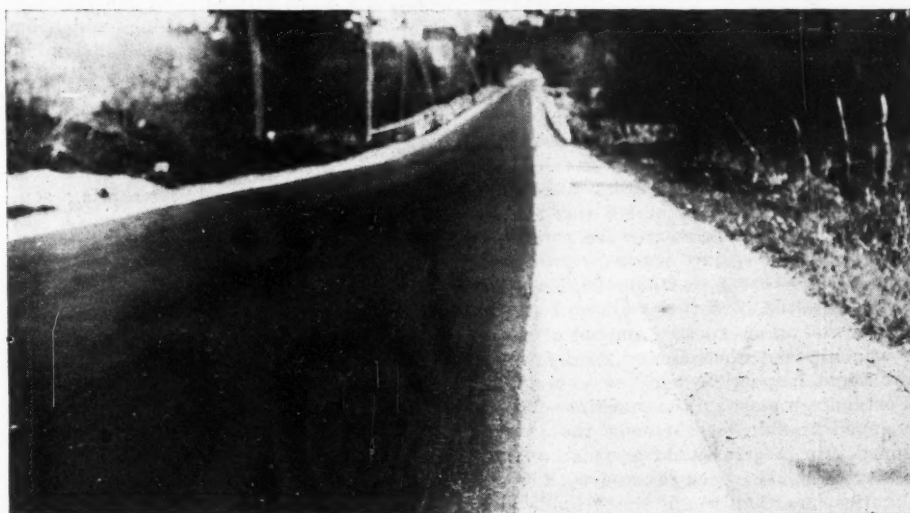
"For want of a road, the truck was lost;

For want of a truck, the acetylene was lost;

For want of the acetylene, the ship-building schedule was lost;

For want of the ships," etc., etc.

Again I say, referring to the part which our highways should play in the prosecution of the war, "Wake up, America!"



How they could be—Naugatuck Valley near Ansonia; Norton, Conn., state road; concrete border construction, North Darien, Conn.; stone foundation for Connecticut road

Michigan Fordsons Tampered With Plugged Oil Tubes and Grinding Compound in the Crankcases Ruin Engines

By Fred M. Loomis

Motor Age Editorial Staff

THE most interesting story connected with the distribution of Fordson tractors in Michigan never has been told. This has to do with the apparent attempt of someone to ruin the usefulness of the machines which were distributed in the state through the War Preparedness Board. When the trouble first was discovered a fugitive item or two appeared in the state papers, but the matter was hushed up quickly. The facts are that about 30 of the tractors included in the first shipments which were made into the state were tampered with so that the engines were almost completely ruined within a few days after they were put to work in the fields. That complete success did not attend what is believed to be an attempt at mischief was due merely to an early discovery of what was being done so that a more rigid inspection at the factory before later shipments of tractors were made prevented a repetition of the trouble.

Oil tubes plugged with solder and crankcases filed with grinding compound all but ruined some of the first tractors delivered before discovery of the cause was made. Fortunately trouble began to develop almost immediately the tractors were put into service and prompt action was taken. Nevertheless some farmers were seriously inconvenienced, spring work preparatory for this year's crops was delayed, loss and expense resulted to both buyers and manufacturer and an unexpected amount of service was imposed upon Henry Ford & Son.

More Rigid Inspection

Fortunately most of the machines which developed trouble were among those first shipped into the state. In as much as the vicinity of Lansing was favored with early deliveries practically all the trouble occurred in that locality. This enabled the Ford company to get on the ground almost immediately with relief and also to put the inspectors at the factory on guard. Never dreaming that anything of the kind could happen, the factory inspection before early shipments may not have been as rigid as it became subsequently, so that the bulk of the damage was confined to the first lots of tractors.

The first intimation of the trouble came when some of the tractors developed knocks almost immediately after having been put into service. Some of the machines almost entirely refused to function. Others, after a few hours or days of service, began to balk. Manifestly, something was wrong, but even yet no one suspected that the machines had been tampered with in any way.

Investigation of those tractors which developed the earliest and worst symptoms revealed, however, that someone had done all that it was possible for him to do to ruin them. Oil tubes plugged with solder at equal distances from the ends, where the obstruction would escape discovery

Editor's Note.—Fred M. Loomis, of the editorial staff of MOTOR AGE, has been on the ground in Michigan since the first of the Fordson tractors were unloaded at Lansing, under the state plan of distribution, with the dual purpose of determining how the plan worked out and how the tractors worked out in the hands of the farmers. Some of the results of his investigation appear on these pages. He will continue to watch them for MOTOR AGE readers, and reports will appear from week to week. During the coming week we will be in Iowa to observe how distribution is proceeding west of the Mississippi River.

and where it would be the most difficult to remove, were found on several machines. On others the crankshaft bearings were found to be badly worn and on still others a loss of compression and power indicated a similar condition within the cylinders.

Experts were hurried from the Ford factory and some of the machines which had given the most trouble were disassembled and carefully examined. In addition to plugged oil tubes, quantities of grinding compound were discovered in the crankcases, which, mixing with the oil in the crankcase, thence had passed into the bearings and cylinders, utterly ruining some of the engines. For instance, I saw in the Barr garage at Mason, Mich., three new engines which just had been received to replace as many which had been completely ruined among the few tractors which had been delivered at that point alone. Other new engines were shipped to other points to repair similar damage.

I was taken to the farm of P. M. Barr, near Mason, by County Agent Frank Seeley in order that I might see with my own eyes the results on one of the tractors which had been tampered with. The machine had been completely taken apart by repair men from the Ford factory. Every crankshaft bearing was totally ruined. Even the hard steel of the crankshaft itself showed signs of abrasion. The cylinders were more or less scored and so were the pistons. In short, the engine was completely ruined during the few hours it had been run. When the oil tube in this tractor was examined it was found to be stopped. The heat of a blow torch applied to its middle caused drops of melted solder to run from the end of the pipe, indicating where and how it had been obstructed. Samples of oil taken from the crankcase of the Barr tractor at the time of disassembly were full of grit, easily felt by rubbing a little between the fingers. Nothing but a complete new engine put the Barr tractor into working condition again.

Had Sold His Horses

Mr. Barr's dilemma was serious, too. In anticipation of the tractor and the work it would do he had sold four of his horses, putting the proceeds of the sale into the machine, as he could not afford to keep both horses and tractor. He never

dreamed but that the tractor would compass his plowing and his harrowing. However, almost immediately his tractor went bad, leaving him with unplowed fields so late in the season that he was in doubt whether he could get his crops in this year. Having sold his work horses he was left with a disabled tractor and a few colts too fractious and raw for reliable farm work.

George McKim, Lansing, had almost identically the same experience. His tractor went bad almost as soon as it was started, and for three weeks he was unable to use it. The same conditions of tampering were found in the McKim machine that were discovered in the Barr machine. An entirely new engine was required in this case also. Fortunately, Mr. McKim had some horses available, and he was able to get a part of his work done, but he was seriously delayed nevertheless.

Similar troubles, fortunately less grave in extent, were encountered elsewhere. As an instance of these minor difficulties, but due to the same cause, was the investigation of a bad knock which had developed in the tractor delivered to Creyts Brothers, Lansing. I accompanied George G. Foster of the F. J. Blanding Co., Ford agent at Lansing, to the Creyts farm. Investigation revealed that one of the crankshaft bearings was wearing badly. Scraping the bearing, Mr. Foster discovered a foreign substance which he thought might be emery. Probably, however, it was the same variety of grinding compound which had been put into the other machines which gave trouble. I also examined the find and can say that it was an abrasive of some kind which never would have been where it was found unless it had been put there maliciously.

As stated before, the trouble was confined to about 30 of the first tractors delivered and, as far as is known, no subsequent discoveries of a similar nature were made. Following the first intimation of trouble the factory imposed the most rigid inspection and every tractor was thoroughly examined before it left the factory so that if anything was wrong it was immediately detected and remedied. But that a deliberate and malicious attempt was made to ruin as many of the Michigan tractors as possible cannot be denied in the face of the mass of evidence which has been found.

OHIO OWNS 2000 TRACTORS

Columbus, Ohio, May 27—The combined efforts of the state, the banks, the manufacturers of tractors and the retail dealers of the state during the last month have increased the tractor population of Ohio by at least 30 per cent, and it is estimated that approximately 2000 tractors now are owned by Ohio farmers. Nor will the close of the month see any cessation of effort upon the part of those who are interested in putting as many tractors as possible into the state. While the time for spring plowing is past it is the purpose to induce as many farmers as possible to buy tractors in order that they may be equipped to do their fall plowing efficiently and rapidly.

The special prices which have been given the farmers on tractors, coupled with the

favorable terms which bankers have been offering in the financing of tractor buying, have stimulated buying to a gratifying extent. It is certain that by the time it is advisable to prepare the fields for the 1919 crop Ohio will be one of the best equipped states in the Union to apply power-farming methods, hence it will be in a position materially to assist in the production of food products.

FARM EQUIPMENT RETAILERS

Washington, May 25—Retailers of farm equipment including trucks, trailers and tractors will not be required to obtain licenses under the recent Presidential proclamation. Retailers are defined as "a person, co-partnership, firm, corporation or association not doing wholesale business, and with gross sales not exceeding \$100,000 per annum."

However, under provisions of the proclamation, steps will be taken to prevent profiteering by retailers. They will not be allowed to make unjust charges, unreasonable rates or contract for more equipment than is demanded by the reasonable requirements of the business.

BETTER FARMING WEEK

Bloomington, Ill., May 27—The C. U. Williams & Son Co. is planning a Better Farming Week for June 10-15. During this time it is planned to show the farmer of Central Illinois how the various applications of gasoline power in the way of motor cars, motor trucks, motor cultivators and tractors can assist in the economical operation of the farm and also how they increase not only the efficiency of the individual farmer by enabling him to till more acres but also making each acre produce more. The C. U. Williams & Son Co. is noted for the originality of its advertising stunts and for the success which usually attends them. Better Farming Week will be one of the most pretentious ever undertaken by the company and promises to be one of the most successful. Farmers and dealers from all Northern and Central Illinois will be invited to attend.

TO HOLD POWER FARMING WEEK

South Bend, Ind., May 27—The week of June 10-15 has been designated by the Oliver Chilled Plow Works as National Oliver Week. From now until June 15 the entire Oliver organization, comprising the sales organization of two factories, sixteen branch houses and fifty-three transfer houses, an aggregate of about 500 men, will do nothing else but talk power farming, early fall plowing and buying implements early.

This is perhaps the most extensive plan of co-operation for an entire national sales organization to concentrate its efforts upon one phase of the agricultural and implement situation that ever has been undertaken and the results can be none other than good. Furthermore, it is directly in line with the effort the Department of Agriculture is making to impress upon the minds of the farmers the paramount necessity of adequate farm equipment, in order that agricultural operations may be made more productive, and the equal necessity of procuring equipment early.

Farmers Like the Fordson Tractors Machines Doing Good Work in Michigan But They Are Too Inaccessible for Farm Repair

FOLLOWING the delivery of the Fordson tractors in Michigan from the points of delivery onto the farm, I find them doing entirely satisfactory work in a majority of instances. Some farmers had trouble in the beginning, of course, but most of this was due to inexperience and to the tampering to which some of the tractors were subjected, as told elsewhere. Among those who experienced trouble the case of P. M. Barr was typical. I already have told his story.

In contrast with Mr. Barr, who sold his horses and then suffered from the mistreatment of his tractor, it is pleasant to turn to G. Neller, who secured the first tractor delivered at Lansing. Mr. Neller has been deprived of the use of his horses, too, but through sickness, not through sale. His entire herd has been ill with distemper, "and what we should have done without our tractor I do not know," said his son. "We have done all our spring plowing and harrowing with it, and it never has given us one bit of trouble after we got the few adjustments made to burn kerosene.

"Without our tractor we never should have gotten through with our work under the circumstances. We have kept it at work all day and every day and are right up to date with our work. It was mighty lucky for us that we got it when we did."

The young man spoke from the seat of his machine in a field he was preparing for sugar beets by dragging it with a two-section spring-tooth harrow and two sections of peg-tooth harrow, hitched tandem.

Despite the worn bearing, the Creyts Brothers tractor was cutting two 14-in. furrows 8 in. deep, on land which in places had a heavy grade, and it was clipping along at a speed of almost 3 m.p.h. when Mr. Foster and I reached the Creyts' farm. Aside from the trouble with the bearing the work it had done was very pleasing.

"My man almost roasts with the Fordson in the barn," says W. A. Axendale, Ionia, Mich., who farms 610 acres. "He said to me yesterday, 'Boss, I think almost as much of that little machine as I do of my mother-in-law.' I have used my Fordson as a supplementary machine only," continued Mr. Axendale, "because I have a big four-bottom tractor with which I have done all my plowing. I have followed the big tractor with the Fordson, to which I have had hitched a double-tandem disk harrow of the largest size. It has pulled this without difficulty and has done most excellent work. Do you know what I am going to do? My big tractor packs my ground so I am going to sell it and buy another Fordson, and with the two little machines I will do all the work on my 610-acre farm."

Interviews like these might be multiplied indefinitely, for a majority of the tractors delivered in Michigan have proved to be satisfactory and have done all that was expected of them. Credit, too, must be given to the Oliver Chilled Plow Works

for the excellence of the special Oliver plow that is being used with most of the Fordson tractors. It too has fulfilled every promise as regards quality of performance.

Accessibility Needed

In the story I have told about some of the Michigan machines having been tampered with I mentioned the case of the Creyts' tractor, one of the bearings on which was found to contain grinding compound. I accompanied the Ford dealer at Lansing when he went out to fix it. We spent the entire day from about 8:30 in the morning to nearly 5 in the afternoon on the trip. The Ford man was on his back under the tractor working upside down on the crankshaft bearings for the greater portion of 4 hr. It's no job for an amateur or for the inexperienced farmer, or for any one man, no matter how expert he may be, to take off the bottom of the Ford crankcase and get at the bearings. The farmer stated emphatically that he was mighty glad he did not have to tackle it alone. The Ford man said that attention to the tractor was a garage job and that "he did not want any farmer monkeying with any tractor in his territory—that he intended his service to be such that every tractor within 30 miles would be attended to." At the same time, there come occasions when the farmer possibly, not necessarily here, but in other localities where service is not as good, will have to do some of these things himself, and he will have some job on his hands.

To get the bottom of the crankcase off it is necessary first to drain the crankcase and also the cooling system. Then off must come the triangular brace which connects the front axle to the crankcase. It is necessary also to disconnect one end of the steering rod before the loosened crankcase bottom can be removed. This bottom is held on by thirty bolts, all of which must be taken out. Then all work must be done while lying on one's back on the ground under the machine.

At the Ford factory it is said the company is building, not a fool-proof machine, but "a farmer-proof machine." This is all right maybe, for the tendency of the farmer to contract tinkeritis with disastrous results is well known. Nevertheless, there comes times when the farmer cannot take his tractor to a garage, and when he cannot wait for the service man to come to him, and then he appreciates accessibility of working parts. I am convinced that a little more regard to this qualification would much improve the popularity of the Fordson tractor.

FORDSONS FOR NEBRASKA

Omaha, Neb., May 25—Five hundred Fordson tractors are to be delivered to Nebraska farmers on the same terms as those offered the farmers of Michigan, Ohio and Iowa.

Taking a Gypsy Census

Westward Ho! Playing the Game of Counting Noses on Motor Trip

By Avis Gordon Vestal

WHERE do the motor gypsies hail from? A summary of the replies shows a surprising number of long-distance motorists, both campers and tourists, their number being greater upon the great east and west marked roads than upon the north and south trails, with the Lincoln highway through Nebraska and Iowa leading and the portion of the Santa Fe between Dodge City, Kansas and Pueblo, Col., coming in a good second. Local traffic was also most numerous upon the Lincoln highway. The only horse-drawn passenger vehicles sighted were two seated buggies. Apparently cars are used by farmers when the entire family leaves home at once. The buggies were most numerous at the Sunday School and church hours, while the farm-horse freight wagons dwindled upon that day. The main Mecca toward which or from which most of the motorists met traveled was the foothills of the Rockies in Colorado, expressed by Denver, Colorado Springs and Pueblo. The states most numerous represented by tourists and campers were Colorado, Oklahoma, Texas, Nebraska, Kansas and Iowa. The central states, as Ohio, Indiana and Illinois followed down the line, while a sprinkling came from New England, the South, West and Northwest, California leading in this lesser group.

Census Taken on Trip

During July and August, 1917, the writer made a motor camping trip from Chicago to the Rockies and return. On the westward trip observation was centered upon finding other happy vacationists, who usually recognized our kinship of interest by waving or shouting a greeting. As soon as an approaching car showed up in the distance the question would be, "Does it bulge?" If its outline grew perfectly symmetrical as it approached it usually carried passengers only, and usually for but local or one-day rides. When its form was knotty or irregular it commonly showed at least a brace of suitcases upon one runningboard or a camp equipment spread upon both runningboards and often overflowing up the mud guards, over the hood, upon a back platform or even upon the roof. Several times we actually spied sets of wire bed springs tied to the top! By the starting of the return journey the game of observing the traffic and its character had grown so fascinating that a definite count of all sorts of moving vehicles, both gasoline and hay motors, was made and recorded for most of the way.

In the Show-Me-state, as in each succeeding state to the westward, the tourist traffic increases gradually. Though increasingly more taken for granted, in Missouri a few minutes' halt at the curb for supplies usually brought up a little throng of politely inquisitive men and boys. From Hannibal southwest, along the marked University trail, we met no campers, no

tourists and little local traffic in the hills. Columbia we sighted a car bound from Denver to St. Louis and were hailed from a roadster by two men who carried a compact camp outfit and a huge placard, "From N. Y. to Frisco and we'll cut your hair."

Westbound, Columbia to Kansas City by the National Old Trials, we were ferried across the Big Muddy with a tourist family from Philadelphia. At Wellington three Oklahoma camp cars whizzed eastward. Near Levasy our camp was shared by a Tippecanoe City, Ohio, party returning from Lawrence, Kan. But one other set of campers was seen in this state.

Our way across the Sunflower state was shaped by two visits. From Kansas City we followed approximately the course of the Kansas river, seeing the marks of several minor highways, through Lawrence and Topeka to Manhattan; thence southwest through Fort Riley and Salina to Wilson; now directly south by the Sunflower trail across the lonesome, high plains to Ellinwood; and again a little south and much west through Dodge City on the Santa Fe trail to the Colorado line. In the eastern part of the state we met little tourist traffic, only one such car at Eudora, another at Lawrence, two at Manhattan, two at Ogden, and a New Mexico Ford at Fort Riley. Local residents said hundreds of cars came every Sunday to visit the new Camp Funston, just east of the old Fort Riley and that July 4th the traffic was so heavy and the earth roads so cut up that the clouds of dust caused several minor accidents.

From Central Kansas to Pueblo, Col., the dry climate favors the o. f. tourist and we saw more prairie schooners than ever elsewhere. Fifteen other parties of motor tourists, five being also campers, were met between Fort Riley and Dodge City. One of these was from Colorado, one from Indiana. At Dodge City we entered the real river of tourists, gathered from many tributary courses and all alike following the historic Santa Fe onward to Pueblo, where they again diverged. A noteworthy addition here is the stream of cars from southern Kansas and the flood of camp cars from hot Oklahoma, all seeking the coolness of the mountains. There was a constant procession of vacationists a la gasoline through Dodge City. Ten parties camped there one night, one from Marshalltown, Iowa. Westward of this town we had much company of tourists and campers but saw little local traffic. Definitely cataloged I find four high-priced cars carrying real gypsies eastward, three fine California cars, also speeding toward the rising sun and a tractor drawing easily three huge trailers of alfalfa hay.

In Pueblo, Colorado Springs, Manitou

and Denver, the Mecca of thousands seeking beauty and refreshment of spirit, the name of the motor tourist is legion, and I am inclined to think his first name must be Oklahoma. License plates bore the names of nearly all the states of the union in a reasonable ratio to their distance from the hub of the West. Oklahoma, Texas, Kansas and Nebraska appeared to take the lead, with the central states making a fair showing and a sprinkling of the far west and New England. All the highest priced cars answered to roll call, often with hired chauffeurs. These stood more often for hotel guests or cottages, many having ridden from home in them, others coming by train and shipping the car or sending it overland with the chauffeur. A smaller number of expensive cars, especially from Oklahoma, thousands of cars in the \$1,000 to \$2,000 class, and hordes of Henrys had conveyed the camping parties.

In Free Camps

We have no count of the large numbers of cars belonging to hotel guests and cottagers, but made a check list of motor gypsies in the free municipal camps. At Pueblo, 8 p. m. of a July Sunday, thirty camps neighbored our tent and others came in after dark. An early morning tour of Prospect Lake Park, Colorado Springs, revealed seventy cars and eight trailers, the latter mostly from the Southwest. Breakfast time, in Denver city park, showed eighty-three canvas homes, but several had pulled up stakes earlier.

Northwest of Denver, in a series of high valleys quite surrounded by the real Rockies, was our ultimate destination, Rocky Mountain National Park, where free camping is permitted under the pines. Our location was about 4 miles from the village of Estes Park, which is in a larger valley outside the limits of the Government land. From fourteen to twenty-five other families, all from an assortment of states, neighbored us. There were also other spots where groups of our kind congregated.

All the picturesque mountain and valley roads around us were alive with cars. Dozens of states and scores of different cars were represented, from the most luxurious limousines down to the sturdy, cheapest kind. We had spent our 1916 vacation here and could notice an increase in the number of cars brought in by cottagers and hotel visitors. The motor campers, already considerable in number, were practically new since the publicity given in the twelve months before to the Government park, for the land around the village of Estes Park is privately owned and fenced.

Homeward bound, a careful count was kept on the 21 miles of winding road down the Thompson canyon, where cautious driving was necessary, owing to many turns which shut the view, to the roar of the river deadening sounds and to the

fact that passing is possible only at special turnouts. Naturally, we could see little of the cars going east with us, but counted eleven. Carefully we passed the sixty-eight up-bound cars. The descent occupied 2½ hr. Turning northeast, at the foot of the canyon, we headed for Cheyenne and saw little traffic of any sort upon these high plains except for many cars in Fort Collins.

Wyoming was by us spelled C-h-e-y-e-n-n-e, as that was the only place of note, except prairie dog villages, on our path. We joined eight other parties camping on the mesa at the edge of the state's capital. During pioneer days, a period of summer celebration, hundreds of families motor from several states and camp in Cheyenne's park, which we did not see. At Cheyenne we put the Lincoln highway beneath our worn tires and followed it eastward all the way to Cedar Rapids, Iowa, saving for brief detours considered separately. During most of this journey an exact count of traffic of all sorts was kept during the specified hours, the census being along the open highway and into the residence sections of the cities, but omitting the busy business streets.

Must Be Real Campers

In the list all cars of the state in which we were traveling were defined as local unless they bore impediments indicating at least an over-night state of origin. Tourists include, first, all cars bearing suitcases or trunks but no portable homes and, second, cars without visible baggage but bearing the license plates of states other than the one in which they were met. Each number given represents a vehicle with all its occupants. We were in motion eastward all the time, hence relatively little of the eastbound traffic ahead of us and behind could be recorded. Nearly all the cars listed were passed head-on as they sped westward and their speed, added to ours in the contrary direction, made it difficult to read the state abbreviations, the lettering of which is often too small or of colors not plainly distinguished from the background. Where states could be identified they appear in parenthesis. Of those not identified Nebraska probably leads, as her cars lacked front license plates.

A detour from the L. H. at Beaver, Iowa, to visit a remarkable rural church, showed forty cars and no horse-drawn vehicles parked there. A three-day convention was in session, representing a district of the state. Some of the cars were local; others had brought delegates from several counties away. To entertain the strangers a motor procession conveyed them around the vicinity after the program.

In State Center, an Iowa town of about 1000 inhabitants, 200 cars were parked in the streets on band concert night. Medium-priced cars predominated. Our hosts say as many as 335 cars have been counted on similar nights and that nearly every farmer in the fertile land around has at least one car, while several have a large touring car for family use and a cheap car for muddy weather and errands on the farm.

A Sunday side-trip to Des Moines in August brought to light an attractive spot for Iowans who can take short vacations. The state fair was in session and crowded.

The new and immense Camp Dodge was near the city. Iowa National Guardsmen were being mobilized behind the fair site. The largest camp we saw all summer was that of hundreds of families in the shady woods of the state fairgrounds, and most had a car standing beside the tent. All roads led to Des Moines that week, and suitcases or baggage were frequently seen on the cars headed toward the capital.

On the streets of Iowa City, on the Red Ball and River-to-River highways, in 10 min. tourists from Chicago, California and Minnesota were recognized. A trip of 100 miles south from Iowa City to Keokuk, on the splendid surface of the Red Ball, picked up but one South Dakota camper and three tourist cars from Iowa, Illinois and Missouri. Both local and long-distance traffic, especially the latter, were less upon this and all other north and south highways, within our limited experience, even when the roads compared were marked ones. The heaviest traffic we witnessed was on the L. H. through Nebraska and Iowa, with the Santa Fe, Dodge City to Pueblo, a good second.

A Sunday score card on the Cannon Ball, Sept. 2, nearing home, showed these figures: Princeton, Ill., 11 miles, on the northeasterly route to Chicago, at 4:45 p. m.; three campers, eleven tourists, and 166 local cars.

GUYNEMER'S ENGINE

(Concluded from page 9)

Government offices in Paris, where the problem of aviation engines was causing grave concern.

Major Martinot-Lagarde, as the leading army airplane engine expert, and two other officers, were sent to Barcelona to investigate. They reported that it was a wonderful engine, but admitted that they were scared at the bold design. In consequence, Marc Birkigt was informed that the Government would consider the purchase of the engine if it could successfully pass a 50-hr. full-load test. The engine was brought to Paris, erected in the Army laboratory, and run for 50 hr. under load with very satisfactory results.

Immediately an order for fifty was placed, followed shortly afterwards by very important contracts, and then by instructions that other factories should take up the manufacture of Hispano-Suiza motors. From the day he made his first drawing the shops at Barcelona to the date the first engine was put under power, exactly 3 months elapsed. During those three brief months Marc Birkigt laid the foundations of a fortune which up to the present date has netted \$20,000,000. Run for the first time in March, 1915, the number of Hispano-Suiza motors which had actually been in the air by January, 1918, exceed 40,000. Eighteen firms in France have secured licenses to build this engine, while other licenses have been given out to England and to the United States. On every engine built in the Hispano-Suiza shops Marc Birkigt was paid a royalty of \$600; every licensee pays a royalty of 10 to 15 per cent of the selling price of the engine to the parent concern, and on each engine built outside, the inventor secures \$200.

Designed to meet the requirements of early 1915, which were for a maximum power of 150 hp. the Hispano-Suiza was a complete success. The fact that it was designed, built, produced in series and made the leading motor of the French army in much less than 6 months is ample evidence of the complete soundness of the design. When flights at high altitudes became common, it was found necessary to increase the compression to overcome the loss of power due to the decrease of atmospheric pressure.

This was successfully accomplished. After 12 months service the call was for more power, and Engineer Birkigt was asked to increase the motor speed and gear down the propeller. This was done, allowing 220 hp. to be obtained, although the engine was never as reliable as the original one with the direct propeller.

Before he was captured by the Germans, Roland Garros devised a system of firing between the blades of the propeller. When the geared down propeller was adopted Engineer Birkigt improved on this by firing through the propeller hub. The Hispano-Suiza motor is an eight-cylinder V type, the cylinders being an aluminum casting with steel liners.

Engineer Birkigt does not claim to be the first man to make use of aluminum for cylinders, this having been done experimentally in France years before, and at least one aluminum engine being built commercially in the United States at the time the French aviation engine was produced. Originality is claimed, however, for the method of screwing the liners into the cylinders. Another original feature is the direct operation of the valves, without the use of any follower between the cam and the valve stem, thus getting not only a better valve opening but decreasing the number of parts.

Compared with a motor of the Mercedes type, the number of parts is 900 for the German to 400 for the French. The amount of raw material required to produce a Hispano-Suiza motor is exactly one-third less in weight than that for a motor of the Mercedes type. The value of this does not lie primarily in the lessened cost for material, but in the reduced cost of production by reason of the smaller amount of machining.

Unlike many prominent designers, Engineer Birkigt does not seek merely to produce a beautifully finished article but always keeps in view the methods of which that article will have to be produced. He makes his own tools, and many of the machine tools built by American machine tool manufacturers are to his designs.

STAR HIGHWAY TO CONVEVE

Frederick, Okla., May 24—The Star Highway Association will hold its second annual convention here June 5-6. A parade showing the advancement in the mode of travel will open the convention. A band of Indians will be followed by an old-time oxen team and wagon, the prairie schooner, then on down the line to the late motor car. The towns and counties through which the Star highway passes will be asked to have cars in the parade.

Federal Trade Charges Commission Accuses Eleven Pump and Tank Concerns of Unfair Competition

Seven Alleged to Discriminate in Price

WASHINGTON, May 24—Eleven companies manufacturing and selling pumps and tanks for storing and handling gasoline and oils are charged with unfair trade competition by the Federal Trade Commission. Seven of the companies also are charged with discrimination in price in violation of the Clayton Act. The concerns named are the Wayne Oil Tank & Pump Co., Fort Wayne, Ind.; Gilbert & Barker Mfg. Co., Springfield, Mass.; Atlantic Refining Co., Philadelphia, Pa.; Standard Oil Co. of Ohio; Standard Oil Co. of Indiana; Standard Oil Co. of New York; Standard Oil Co. of Louisiana; American Tank & Pump Co., Cincinnati, Ohio; Milwaukee Tank Co., Milwaukee, Wis.; Tokheim Mfg. Co., Cedar Rapids, Iowa; Guarantee Liquid Measure Co., Pittsburgh, Pa.

The Wayne Oil & Tank Co. is charged with intent and effect of circulating reports purporting to be copied from a news item published in the Indianapolis News telling that an injunctive decree had been issued against a certain competitor and that this competitor had been found by court to be engaging in competition and violation of the Sherman anti-trust act. The company also is charged with inducing customers and prospective customers to rescind orders and cancel contracts with competing firms and with enticing away competitors' employees. It is also charged that the company has represented:

Various Charges

(a) That certain devices manufactured and sold by competitors were actually made by the Wayne Oil Tank & Pump Co.

(b) That certain devices manufactured and sold by the Wayne Oil Tank & Pump Co. were manufactured and sold by its competitors.

(c) That certain competitor's agents and employees were actually employed by the respondent company.

(d) That a certain competitor company was one and the same with the respondent.

(e) That products of its competitors were inferior, cheap in quality and would not operate properly.

(f) That certain of the products of its competitors had been condemned.

(g) That the offices and plant of a certain competitor had been closed by an order of the court.

Under the Clayton Act, it is charged that the Wayne Oil Tank & Pump Co. has discriminated in price between different purchasers of pumps, tanks and the like, the effect of which may lessen substantially competition and tend to create a monopoly.

The Gilbert & Barker Mfg. Co., Springfield, Mass., is charged under the Federal Trade Commission Act with false and defamatory statements concerning the prod-

uct of certain of its competitors, representing that they were unsatisfactory and would not operate. The company is charged also with inducing customers and prospective customers to cancel orders and contracts with competitors. The company is charged also with falsely representing itself to be the agent of certain competitors and quoting exorbitant prices for the products of these competitors.

Under the Clayton Act, the Gilbert & Barker Mfg. Co. is charged with discriminating in price between purchasers of its product, thus tending to lessen competition and to create a monopoly.

The Atlantic Refining Co. of Philadelphia, the Standard Oil Co. of Ohio, the Standard Oil Co. of Indiana, the Standard Oil Co. of New York, and the Standard Oil Co. of Louisiana, are charged under the Federal Trade Commission Act with:

(a) Falsely representing the products of some of its competitors to be unsatisfactory and defective.

(b) Inducing customers and prospective customers of competitors to rescind orders and cancel contracts with these competitors.

(c) Selling their products at or below cost to stifle and suppress competition.

(d) Threatening to sell gasoline and oils direct to consumers in some localities, with the design of forcing dealers to refrain from purchasing and installing the products of these competitors.

(e) Falsely representing themselves to be the agents of certain competitors, and quoting exorbitant prices for the products of these competitors.

Under the Clayton Act, these companies are charged with discriminating in price between different purchasers of their products.

American Tank & Pump Co., Cincinnati, Ohio; Milwaukee Tank Co., Milwaukee, Wis.; Tokheim Mfg. Co., Cedar Rapids, Iowa; and Guarantee Liquid Measure Co., Pittsburgh, Pa., are all charged in the complaints against them with inducing customers and prospective customers to rescind orders and cancel contracts with competitors.

MILWAUKEE BOOSTS RED CROSS

Milwaukee, Wis., May 27—Among the larger subscriptions reported by the Milwaukee committee on the Second Red Cross Relief Fund campaign among concerns identified with the motor industry are the following: A. O. Smith Co., \$10,000; Cutler-Hammer Mfg. Co., \$5,000; Kearney & Trecker Co., \$10,000; Kemp Smith Mfg. Co., \$5,000; National Enameling & Stamping Co., \$2,000; Gender, Paeschke & Frey Co., \$1,000; Harley-Davidson Motor Co., \$2,000; Walter Davidson, \$2,000; William, Arthur and W. C. Davidson and Frank Wood, \$1,000 each; W. S. Harley, \$500; O. C. Hansen Glove Co., \$2,000; National Brake & Electric Co., \$1,000; Sivyer Steel Casting Co., \$1,000; Geo. H. Smith Steel Casting Co., \$1,000; Crucible Steel Casting Co., \$1,000.

The Milwaukee works of the International Harvester Co., which are the automotive works of the group, contributed \$20,000, the largest individual corporation subscription yet made in Milwaukee in this campaign.

Detroit Patriotic Work Motor Industry Helps Bring the Total to \$4,821,004 on Fifth Day of Drive

Other Michigan and Ohio Cities Score

DETROIT, May 25—The fifth day of the Detroit Patriotic Fund drive brought in \$1,366,066, the highest aggregate for any 24-hr. period since the drive began, bringing the total amount subscribed to \$4,821,004. Adding the contribution already pledged but not reported, because the canvassing of the plants is still incomplete, will swell the total to nearly \$5,500,000, just \$1,500,000 short of the quota. The amounts figured on to make up this aggregate comprise pledges from Ford employees of \$350,000; American Car & Foundry employees, \$100,000; Studebaker employees, \$350,000; Fisher Body Corp., \$40,000; and employees of miscellaneous concerns, \$45,000, which together with partial donations from the employees of Dodge Brothers and other big firms will account for \$750,000. Detroit came across thus:

\$1,028,353.00 the first day,
660,202.00 the second day,
874,429.00 the third day
901,958.00 the fourth day,
1,366,066.00 the fifth day.

The following is a partial list of the contributions from automotive plants:

Employees Packard Motor Car Co.....	\$185,254
Employees Cadillac Motor Car Co.....	36,945
Detroit Steel Castings Co. and employees	25,000
Employees Continental Motor Co.....	18,178
Employees C. R. Wilson Body Co.....	15,506
Officers Kelsey Wheel Co.....	13,000
Employees National Can Co.....	5,906
Employees Hupp Motor Car Corp.....	5,400
Employees Caille Brothers.....	2,517
Employees Brass Products Co.....	594

With the exception of three counties from which official returns have not yet been received, every county is over the top in the Red Cross drive. An over-subscription is expected.

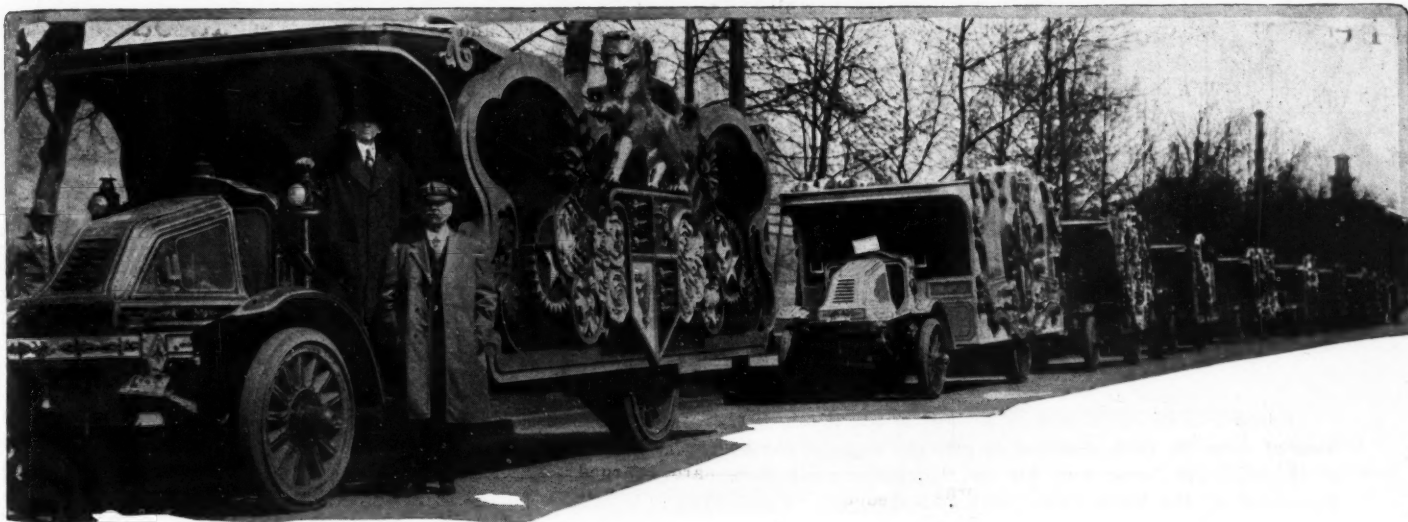
100 Per Cent

Genesee County in which Flint is situated had more than 100 per cent over-subscription after the fifth day's work, \$317,751.95 being pledged by this time. The quota was only \$147,000. Factories subscribed \$30,963.32; manufacturing companies \$150,500.00; Dort Motor Car Co. showed a 100 per cent subscription.

During the five days of the drive Grand Rapids raised \$375,000, of which the manufacturers pledged \$119,377.

Total contributions for five days' work in Cleveland reached \$3,710,214. An over-subscription of the \$6,000,000 war relief fund is expected before May 27.

Toledo has pledged \$1,007,387.44 for its war chest. More than \$250,000 more, however, has been turned in and refused because the givers did not respond generously enough. Three million dollars is Toledo's quota. Champion Spark Plug Co. with \$25,000 and Sun Oil Co., a foreign-owned corporation, with \$20,000 were among the largest contributors. Corporations' subscriptions for five days of the drive total \$319,509.



You get some idea of how the line of motorized animal wagons looks in the circus parade

EVEN elephants are joy riders in "The World's First and Only Automobile Circus" which began a tour of the United States from Toledo, Ohio, May 15, stopping at cities and towns which never saw a circus before.

Six hundred thousand dollars' worth of pure gold leaf spread on 150 motor trucks of 60 hp. each causes the brilliancy of these trucks to rival that of a July sun as this new thing, absolutely new in the circus line, moves through city streets. The procession covers fifty city blocks as it moves along. Only three of these huge trucks can travel safely on a city block at one time, and if it were not for their gay colors, they would be mistaken for a new form of British war tanks.

This new motor circus was mobilized at Toledo through it being a central point for the huge trucks built in various cities to assemble. There are motor menagerie cars, motor sleeping cars, motor kitchens, motor hospital cars, motor service cars and motor gasoline tank cars, besides motor tank cars for oil.

The circus cost on an average \$12,000 for each of the elaborately decorated motor trucks. There are nearly 100 of these trucks, which pull trailers. It is estimated they will save \$1,000 a day on horse feed and railroad transportation and stable hands, as well as locomotives, freight cars and other railroad equipment the Government needs to win the war.

It will bring its blessing to every cross roads hitherto denied circus joys for lack of railroad facilities. It will make limited jumps to 30 miles a day, so it will be at the next town in the time that it takes the old-fashioned railroad circus to load its equipment on wagons and then reload on trains.

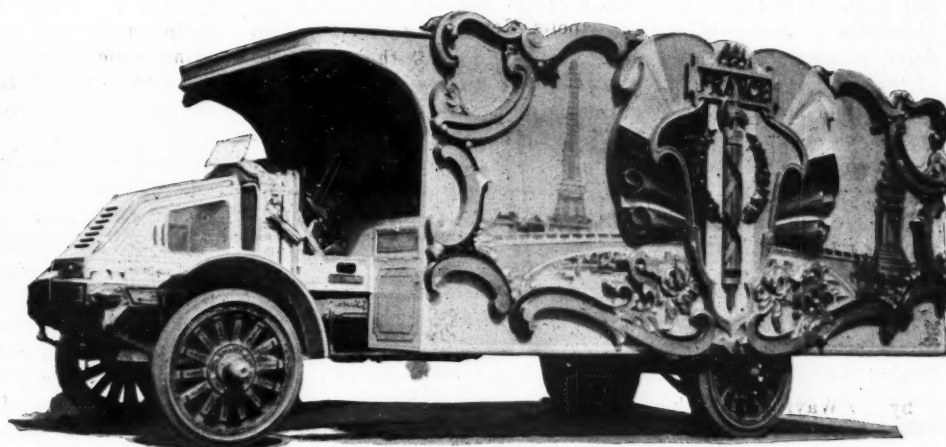
Gasoline and oil will follow the caravan in tank cars. Creeper tractors will put the circus out of ruts. Each car is driven by a 60 hp. engine.

The old-fashioned circus hand who drove stakes with mighty oaths will not be in this circus. His place is taken by a car equipped with machinery that drives stakes and pulls them out in a second.

Yet there are those who say circuses are always the same.

Motors for the Circus

Lion, Bear and Monkey Will Come to Town in Great Style This Season



This is what many a small boy will call "some car"

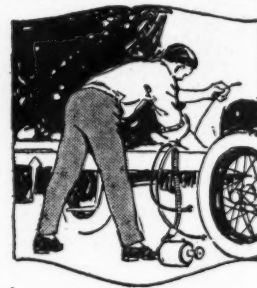


Even Solomon in all his glory never had the equal of this



Electrical Equipment of the Motor Car

By David Penn Moreton & Darwin S. Hatch.



Editor's Note—Herewith is presented the ninety-sixth installment of a weekly series of articles begun in MOTOR AGE, issue of June 29, 1916, designed to give the motorist the knowledge necessary to enable him to care for and repair any and all of the electrical features of his car, no matter what make or model it may be. At the conclusion of this series, "Electrical Equipment of the Motor Car," with additions, will be published in book form by the U. P. C. Book Co., Inc., New York.

A thorough explanation of the fundamentals of electric circuits preceded descriptions of the general types of starting, lighting and ignition apparatus, signalling devices, magnetic transmissions, etc. This is being followed by the installation, care and repair of individual systems, beginning with the special equipment for Fords.

Part XCVI—Disco System for the Ford Car

THE Disco electrical system for the Ford car is a single-wire, two-unit, 6-volt system. The generator is driven direct from the engine crankshaft by a silent chain, and the starting motor transmits its power to the engine crankshaft through a Bendix drive which automatically engages a gear mounted on the shaft of the generator. Both the generator and the motor are mounted on a special bracket which is attached to the left-hand side of the engine, as shown in Fig. 537. The starting switch is of the electrically-operated type, and the output of the generator is controlled by an electro-magnetically operated regulator. A cut-out of the electromagnetic type controls the connection between the generator and the battery.

Preparation of Engine for Installation

Before removing any part of the engine make sure the carburetor is properly adjusted and that ignition is operating satisfactorily. Remove the hood, radiator and fan from the car. Also remove the first and third crankcase bolts, on the right side of the cylinder casting as viewed from the front of the car, and place on the cylinder casting the bracket provided for supporting the Disco. The holes in this bracket will register with the two crankcase bolts which have been removed. Fasten this bracket down securely with the two longer cap screws provided for this purpose, taking care to place the spring lock washers under the heads of screws. The dog at the end of the crank handle will be of no further use, as this is now a part of combination fan pulley and crankshaft sprocket, and when replacing the starting crank it will be only necessary to drive into the hole in the crank handle the $\frac{1}{8}$ by 2-inch steel pin supplied with the outfit.

Drive out the $\frac{3}{8}$ -inch pin that holds the fan pulley in place,

making sure that the pin is in a vertical position to allow it to drop through the hole in the bottom of the front motor support. Remove the pulley, and place on the crankshaft the combination sprocket and fan pulley provided, using the special $\frac{3}{8}$ -inch pin for pinning same to the crankshaft. This pin is necked at one end, which should enter last so that the neck will indicate with the hole drilled through the fan pulley and sprocket. A cotter pin is provided for inserting in this hole to prevent the crankshaft pin from working loose. Remove the cylinder head retaining bolts No. 1, 2 and 3 on the right-hand side, replacing it with special bolts provided, thus securing the top supporting bracket. Remove the cylinder head retaining bolt No. 4 on right-hand side and replace it through the bracket of the solenoid starting switch, thus securing it in place.

Great care must be taken after removing the cylinder head retaining bolts not to allow any dirt or filings to enter these holes or there will be danger of cracking the cylinder casting when replacing these bolts.

Installing Electrical Unit

Place the Disco motor and generator assembly on the lower supporting bracket, when tapped holes in the brackets on same will register with the slotted holes in the supporting brackets. The four hexagon-head cap screws provided for this purpose may be screwed in place, taking precaution to use lock washers under the heads of same. These screws are distributed as follows, two through top supporting bracket and two through lower supporting bracket. The upright screw in the lower supporting bracket should be run down as far as possible and the silent chain placed around the sprockets, the ends being brought together and pinned. To facilitate reaching the chain-tightening screw mentioned, it will be advisable to cut out a small piece of the sod pan so that this screw may be operated by a socket wrench from underneath the chassis. The four hexagon-head cap screws mentioned may be set up snugly enough to support the Disco motor and generator assembly, when the upright screw in the lower supporting bracket may be run up until the chain is of the proper tension, it being borne in mind that too tight a chain will cause undue strain on the bearings of the generator and a loose chain will allow whipping and its consequent troubles. When the proper tension of the chain has been obtained, the four hexagon-head cap screws may be tightened securely.

Next place the fan in the original position, after equipping it

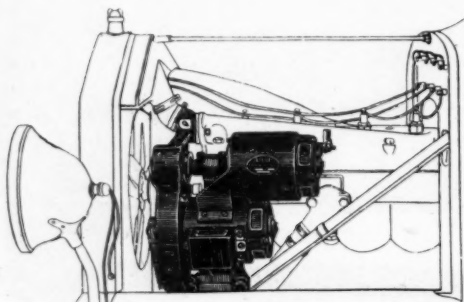


Fig. 537.—Disco two-unit starting and lighting system mounted on the Ford car

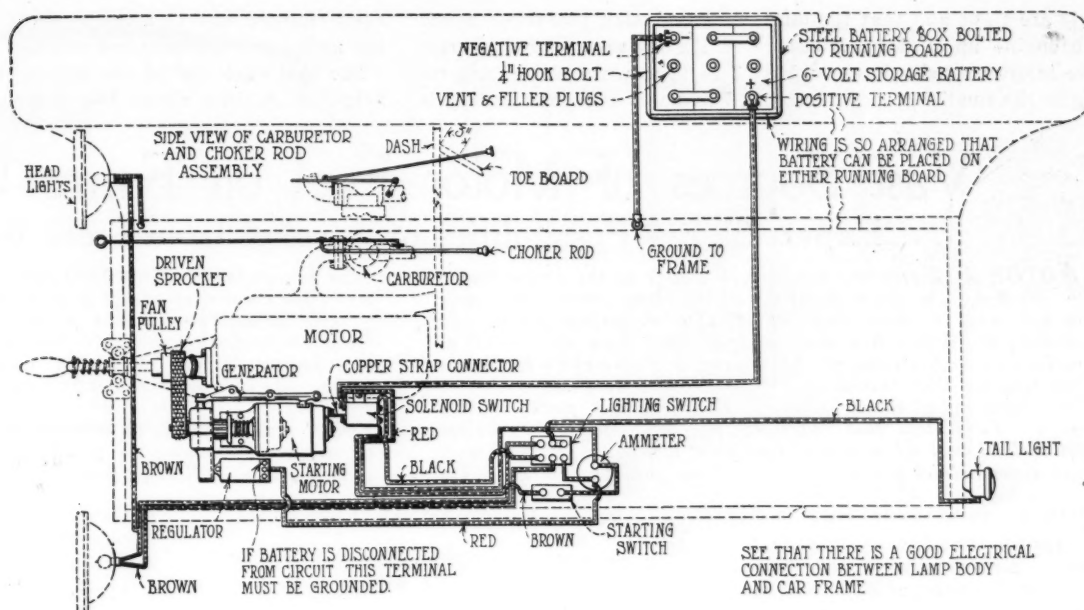


Fig. 539.—Complete wiring diagram of the Disco two-unit starting and lighting system for the Ford car

with the small split-fan pulley provided with the outfit. Place the fan belt to run on this new pulley, and tighten the belt as before. It will be found necessary to cut about $\frac{1}{8}$ inch off each side of fan belt to bring it down to $\frac{3}{4}$ inch width to run on the new pulleys.

Combination Switch Box

Place the combination switch box on the steering post so that the face of the ammeter is about $\frac{1}{2}$ inch below the horn button. Secure it to the post with the clamp and four screws provided for this purpose. Drill a $\frac{3}{4}$ -inch hole through the dash in a vertical line above the steering post and as close as possible to the flange of it for the flexible conduit. The conduit should be clamped to the steering post with the clamp provided, about midway between the switch box and the dash. Drop the flexible conduit vertically on the other side of the dash, and secure it near the end with a pipe clip.

Wiring and New Choker Rod

Study the wiring diagram carefully, and make all electrical connections as securely as possible.

Place the battery box on the running-board about 3 inches from the front end. The outside edge of the box should be flush with the edge of the running-board. Drill six holes to correspond with the holes in the bottom of the battery box. Fasten the battery box to the running-board with the four bolts provided. Place the battery in the box and fasten it by the hook bolts furnished. Cut large holes in the splash plate in direct line with the large holes in the side of the battery box. These holes should be made by making two diagonal cuts at right angles to each other and bending the edges in to provide a large surface and prevent abrasion of insulation on heavy cables. The long heavy cable is to be used from the positive, +, post of the battery to the solenoid switch, Fig. 538. The short heavy cable is to be used from negative, —, terminal to the ground, which may be made by drilling a $\frac{3}{8}$ -inch hole in the chassis frame opposite the holes in the splash plate and battery box. Scrape all paint from around this hole until bright surface of metal shows. Securely bolt the terminal of the cable to the frame using the $\frac{1}{8}$ -inch by $\frac{3}{4}$ -inch bolt furnished. Do not connect the wires to the battery until installation is entirely complete and all is in readiness for starting.

The engine now should be cranked by hand to make sure that everything is lined up properly and that chain does not bind. Make a careful examination to see that all bolts and nuts are in place and properly fastened and that all electrical connections are correct and properly taped up to insure insulation.

Remove the old choker rod and replace it with the one supplied, allowing it to run through the small brace furnished, which should be anchored under the head of the bolt in the flange connecting

the carburetor to the intake manifold. Allow the front end of the choker rod to pass through the hole in the radiator, through which the original choker rod passed. Bend a ring in the outer end of the rod after the radiator is in place. Drill a hole in the toe board 2 inches from the top directly back of the carburetor and place the short $\frac{3}{8}$ -inch rod supplied through the hole, connecting it to the loop in the main choker rod, and replace the button on the other end. Fasten the rear end of the main choker rod to the arm of the choke valve on the carburetor. See the wiring diagram in Fig. 539.

Remove the steel water pipe between the radiator and the engine, and replace it with the special pipe provided for this purpose. Replace the radiator on the car, and hook up the water manifold as before. Fill the radiator with water, and everything will be in readiness to start the engine.

First connect the battery leads. To start the engine, place the spark and throttle levers in the customary position, that is, spark retarded and throttle about a fourth open. Depress the small button on the left-hand side of the switch box, and the starter will spin the engine, provided proper adjustments have been made. The engine should pick up immediately under its own power. If necessary, push down the choke rod on the toe board to facilitate starting. Run the engine slowly at first until you are sure that the outfit has been hooked up correctly and that all bolts and



Fig. 538.—Some of the smaller parts of the Disco starting and lighting system for the Ford car

nuts are tight and that the outfit is functioning properly. Speed the engine up slightly, and note if the ammeter shows charge. The instrument should show from 7 to 11 amperes charge according to the condition of the battery, 7 amperes when the battery is

fully charged and 11 amperes when the battery is very low. Do not under any consideration attempt to alter the charging rate.

See that each cell of the battery is filled with electrolyte to a height of $\frac{1}{4}$ inch above the plates.

Vast Sources of Motor Fuel on Farms Unused

Expert Shows Possibilities of Alcohol from Field Waste

M**O****T****O****R** **A****G****E** presents herewith an article on the production of alcohol from waste materials on the farm, written by a man who has made a close study of what he is writing about. In presenting it, **M****O****T****O****R** **A****G****E** does so with lines from the speech of President C. F. Kettering of the Society of Automotive Engineers at the Chicago War Dinner in February. Mr. Kettering said:

"We have today about 25,000,000 hp. of animal power in this country. To sustain that 25,000,000 hp. we cultivate 125,000,000 acres of land, and all of that is fuel from which we get the horsepower from animal power. . . . I am positive that we could

raise enough fuel on 125,000,000 acres of ground to give three or four times the amount of energy if we could so utilize it.

"The alcohol situation is perhaps the easiest one to consider from a matter of raising fuel. But our wise and non-thinking American people, through the acts of Congress, have placed upon that prospective industry a tax of \$1 a gallon because some poor, degenerate individual might drink the stuff and kill himself. I cannot predict that alcohol is an ultimate fuel, but until we get industrial organizations studying the possibility, until we give them a motive to study it, we will never find the ultimate one."

By E. W. D. Laufer

Associate Agricultural Commissioner American
Steel & Wire Co.

Long Distance Body

In the design of this long-distance touring body full advantage is taken of the extreme width of the fenders and running boards, the body being built flush with this line from the front seat to the rear. Sleeping accommodations are for four persons and the wheelbase is 120 in. The rear seat is made for two people and all additional space gained is converted into compartments for luggage, etc.

The chief feature of the body is the self-contained arrangement which, when unfolded, makes two beds, larger than the conventional Pullman berth. Each bed consists of a piece of canvas permanently attached to the inside of the unfolding deck portion on the side, with hooks on the other side which hang over a central removable rail. After the rail is put in place in a socket at the back of the car and on a pair of shears in front, a strap, which is also permanently attached to the inside of the deck portion is brought over and attached to a cleat on the inside of the body. When pulled tight this stretches the canvas and makes a good sleeping surface.

The mattress should be thicker in the center to allow for the sag in the canvas and may be of any thickness that will allow it to be folded into its compartments. The side curtains are attached by buttons to the side of the car and to equally spaced fasteners along the cockpit edge of the unfolding portion of the deck when open, making a protection for the bed.

There is but one door; the space on the other side being taken up by a tire-carrying arrangement, the latter being a drum-shaped compartment built directly on the body and of such a size that it will exactly fit the tires, or rims, as the case may be. No attempt has been made to show how the luggage is to be disposed of, as each party would carry a different equipment, but there is ample space and if more is needed large packs or trunks can be carried on the deck behind the rear seats. The large rear compartment might be formed into a kitchenette, with stove, etc., and a door that lets down to form a table. More headroom could be gained by making the top higher, but this would detract from the looks.

great industry of preparing a cheap and highly efficient fuel and motive force on the farm.

Alcohol is prepared from all of these substances by four successive steps, namely, mashing, macerating the ground material with water; converting, treating with acid or malted grain; fermenting, adding yeast and allowing to stand; and distilling, boiling and condensing the steam. The temperature employed for each step is important, hence provision must be made to control it. The mashing temperature is 88 deg. C., or 100 deg. Fahr. The converting temperature is 60 deg. C., or 140 deg. Fahr. The fermenting temperature is 18 deg. C., or 64.4 deg. Fahr. The distillation temperature is close to boiling, according to apparatus used.

Process of Distilling

The first product is an impure alcohol with approximately the strength of proof spirits, namely, 50 per cent by volume. This is redistilled and passed through a columnar condenser. The alcohol then is obtained in a pure form corresponding to about 94 per cent by volume of absolute alcohol.

The first product is known as high wine. In order that the law be satisfied a Government prover and denaturer must inspect the product and denature it, so as to make it unfit for consumption as a beverage. No attempt should be made on the farm to free alcohol of its impurities besides redistilling and bring it to the proper strength.

The by-products of distilling alcohol, namely, the residual mash, is still useful as fattening feed for hogs and other stock if no poisonous weeds have been used, or can be applied to the land as fertilizer if mixed with lime to prevent acidity.

The conversion into fermentable glucose of all the starches is brought about by treating with malted barley or rye, the diastase of which brings about the change, or the mash may be treated with acid which also converts the starch into glucose. The mass then is cooled to the required temperature and treated with yeast and allowed to ferment. As soon as fermentation is completed, distilling is commenced, the alcohol passing over with the steam.

The yield will depend upon the amount of starch and natural sugars present in the original substance or substances from which the mash was made.

FOR a considerable time it has been known that the average farm of the country is producing, besides its crops that are carefully husbanded, a vast amount of material of which no cognizance is taken and which is never recorded as a product of the farm but is simply classed as waste and offal too worthless even to consider.

This state of affairs also used to exist in the great industries such as the packing plants, the oil refineries and the great steel plants, all of which through circumstances then prevalent paid little or no attention to wastes and by-products for economic purposes.

All this, however, has been altered, and it is said that these great industrial concerns at the present time do not waste more than the squeak of the dying hog or the hum of the thousands of wheels that spell industrial greatness.

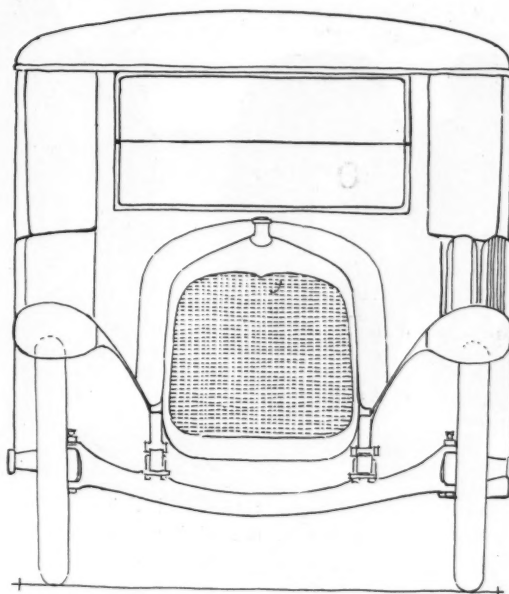
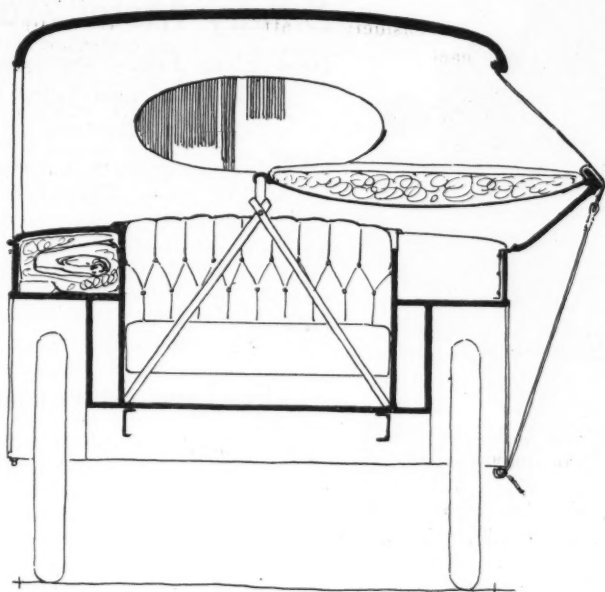
Science Prevents Waste

To bring this about these plants simply employed the science of chemistry combined with technical ingenuity to produce by-products, in many instances worth far in excess of the original substances. The farmer has the same opportunity to avail himself of these saving factors—nay, he has more, he has his problem practically worked out.

From year to year the demand is increasing for cheap and efficient fuel to furnish heat, light, and motive power for farm machinery fuel to furnish heat, light, and motive power for farm machinery and the motor car to haul produce to market. This fuel resides in the wastes and offals of every farm, whether large or small, awaiting only recovery at the hands of the farmer. This fuel is well known under the names industrial alcohol or distilled and denatured spirits.

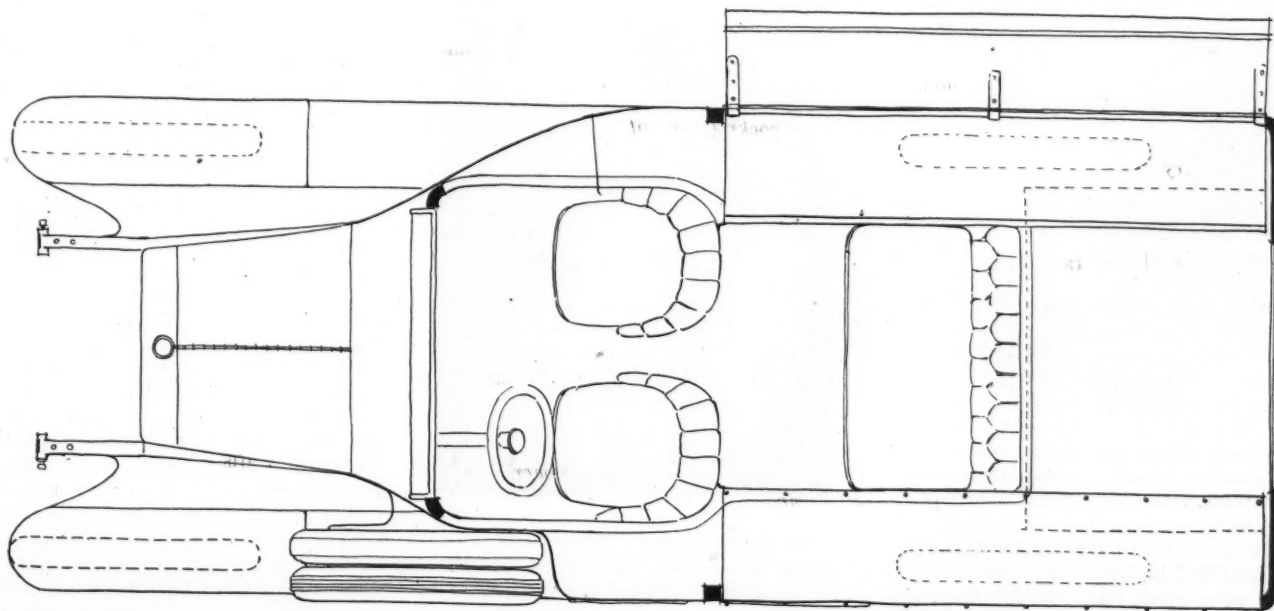
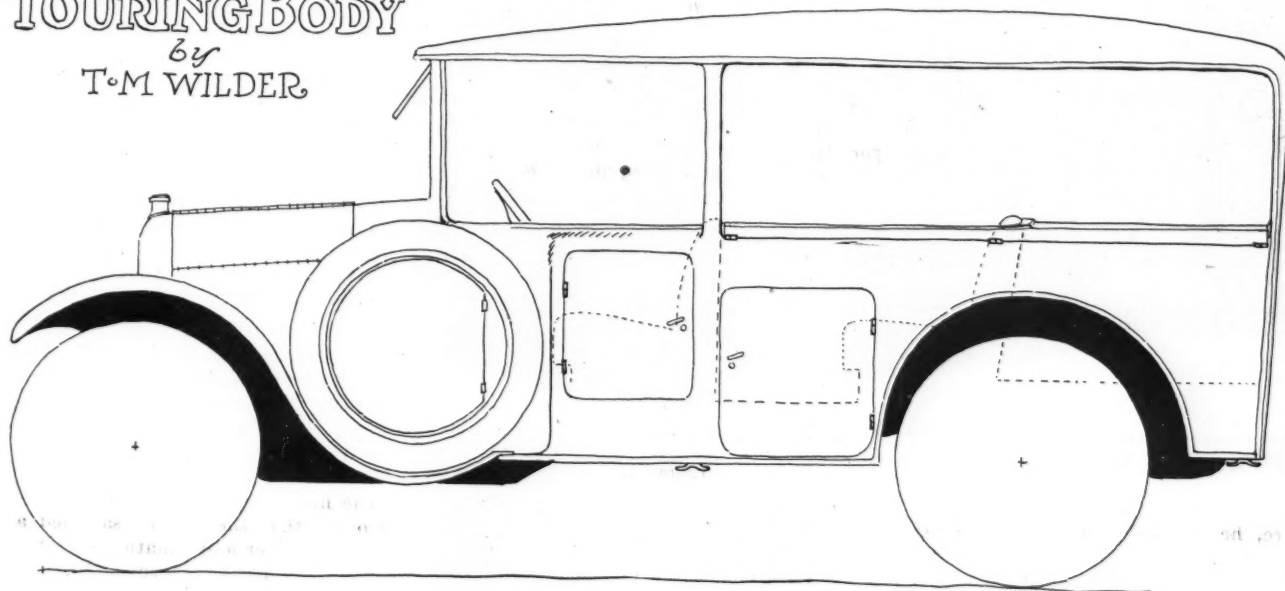
It can be rectified with fairly simple apparatus.

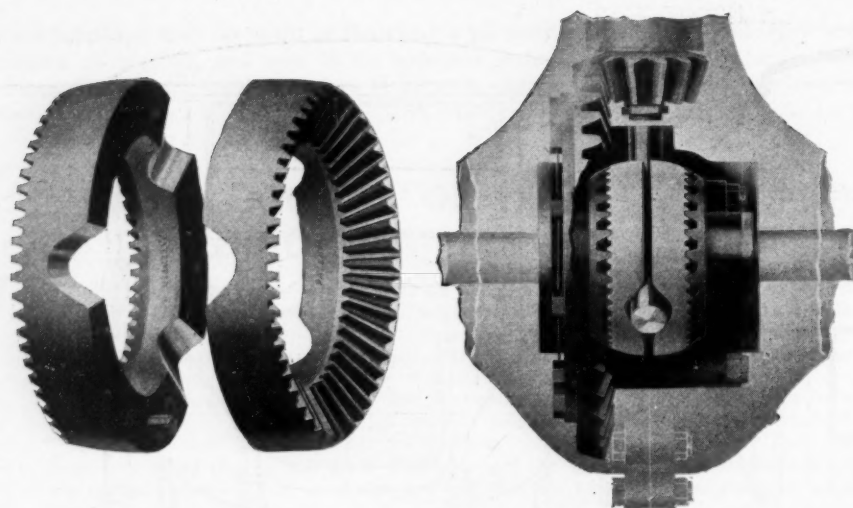
It can be readily produced from any substance that contains starch or sugars, and as there is hardly a growing plant in the universe that does not contain starch or sugar in some form it is apparent that all such things as weeds, corn stalks, corn cobs, potato culls, apples and other fruit windfalls, soft corn and weather-damaged small grain are ready sources of alcohol. All the parings of vegetables, beets, turnips and other root crops, cabbage stalks, in fact, all things of a vegetable nature that are now neglected, lend themselves to this



LONG DISTANCE TOURING BODY

by
T.M. WILDER





Phantom view of the Badger two-wheel drive differential, showing also the two gears installed in place of the pinion gears on the Ford differential spider

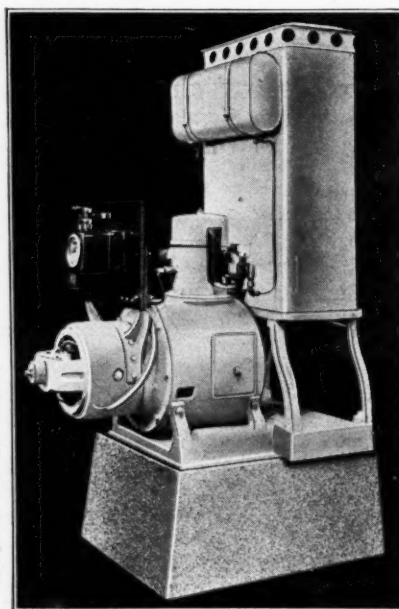


Three-quarter view of the Elcar Sportster, showing the door handles on the outside. Each handle operates with a companion reached from the inside

New Elcar Sportster

A NEW four-passenger sportster model in both four and six-cylinder types is announced by the Elkhart Carriage & Motor Car Co., Elkhart, Ind. The sportster takes the standard Elcar four or six chassis and differs from the regular models only in body and exterior refinements. The body is custom built with beveled edge, giving a clean cut appearance. Beveled plate glass curtain lights with nicked rims are used in the rear and the steering column has been extended to give a racy appearance and afford more room in the driver's compartments.

Nicked door handles are on the outside, each handle operating with a companion reached from the interior. The front doors are square instead of U-shaped and the same sharp lines are carried out in the rear doors. The beveled body edge is in a darker color than the body, affording a rather pleasing effect. The sportster models are finished in olive green, coach blue, olive brown, maroon, beaver brown, and moleskin colors. The standard Elcar chassis is identified in both four and six, outside the powerplant unit. In the four, the



Gile lighting plant, comprising engine, generator, instrument board, tanks, etc., mounted as a unit

Sundry Motor Additions

New Elcar Four-Passenger, Badger Differential and Giles Lighting System

Lycoming engine is used, developing 37.5 hp. at 2100 r.p.m. The six uses the Red Seal Continental engine. The wheelbase is 160 in.; axles are of the Salisbury type, and the bearing equipment is Timken. The price of the four-passenger sportster with four cylinder engine is \$1,175 and with the six-cylinder engine, \$1,375.

Badger Advantages

THE advantages claimed for the Badger two-wheel drive differential is that it possesses all the features of the conventional type, at the same time overcoming all the disadvantages. For instance, it is pointed out that with the ordinary type of differential power always goes to the wheel offering the least resistance, while with the Badger differential power is always on the wheel offering greatest resistance, or the wheel having traction. A differential for the Ford car will be produced first and sizes suitable for other cars as fast as manufacturing facilities will permit. Practically speaking six sizes will take care of most cars. Installation is quite simple. In a Ford, for instance, it means taking out the three pinion gears and putting in the two Badger gears, using the same differential spider. It is made by the Lewis Differential Co., Milwaukee, Wis.

Gile Lighting

THE Gile lighting plant built by the Gile Tractor and Engine Co., Ludington, Mich., is equipped with an engine 2 $\frac{3}{4}$ -in. bore by 3 $\frac{1}{2}$ -in. stroke, of the valve-in-head type. The engine is water-cooled and capable of 600 r.p.m. The generator is rated at 600 watts, although it is said to have a continuous output of 750 watts. The plants are fully equipped, including special governor and an arrangement for using kerosene, if desired. Ordinarily the outfit is mounted on a cement block, with water tank, gasoline tank, and control board in a handy position. The generator is directly coupled to the engine shaft, resulting in a compact construction. Inasmuch as the generator is at the front it makes removal of brushes and adjustments a comparatively simple matter.

TAKES TRUCK TO FARMER

Somewhat out of the ordinary in arousing interest among the farmers of Hartford county in motor trucks is the plan used by Russell P. Taber, Inc., Hartford, Conn., distributor for Reo and Republic trucks. Instead of waiting for the busy farmer to come in and buy his cars every Saturday afternoon he sends a truck and a few of his best salesmen out into the country towns. The cars usually are displayed at the town hall. This plan will be followed all summer. Advertisements are used to boom the proposition, and personal invitations are sent to all the farmers to come to the town hall and inspect the cars.

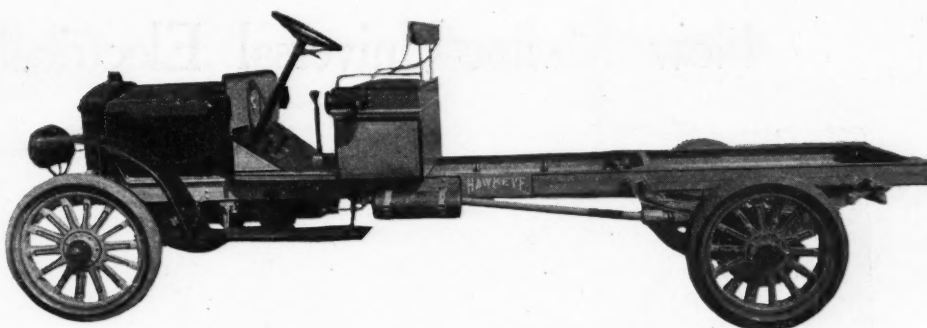
Two Hawkeye Sizes Now

Maker Concentrates on 1½-Tonner
and Will Produce 2-Ton in
New Plant

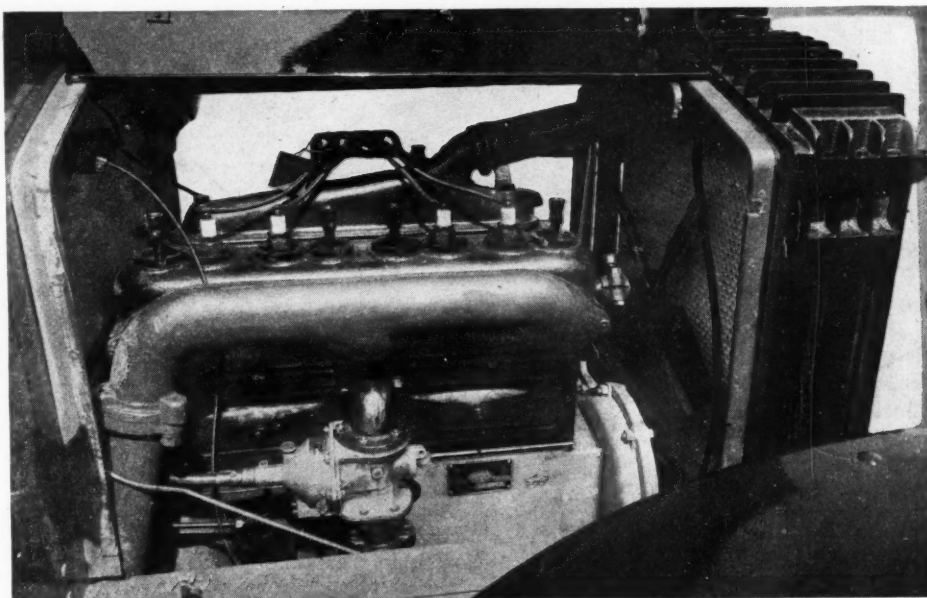
HAWKEYE trucks built by the Hawkeye Truck Co., Sioux City, Ia., are made in the 1½-ton and 2-ton sizes only. At the present time the company is concentrating on the 1½-ton and will not attempt the 2-ton until the new factory is occupied which will be in a few weeks. Model K which is the 1½-ton has a wheelbase of 148½ in., with a body length of 9 to 10½ ft. Model L, the 2-ton job, has the same wheelbase, with a total body length of 11½ ft. Both use a Buda, four-cylinder, enblock engine. The cylinders are L-head, with a bore and stroke of 3¼ in. by 5½. The engine is essentially a heavy-duty type, water-cooled, three point suspended, governor controlled and has a maximum speed of 16 m.p.h. Oiling is by a pump system with oil pump located on side of crankcase. Carburetion is by a Zenith, which has automatic adjustment. Ignition is by an Eisemann high-tension magneto. The engine is cooled by means of a centrifugal water pump and 16-in. ballbearing fan, driven by a 1¼-in. belt. In unit with the engine is a Bork & Beck clutch and gear-set mounted on S.K.F. annular ball bearings. The radiator is cellular, with cast shell mounted independently of the hood. The water capacity is 6½ gal. The gasoline tank, containing 22 gal. is mounted under the seat. Left-hand drive is used, with spark and throttle levers mounted under the steering wheel and foot accelerator, gear shift, and brake lever located to the right of the driver in center.

Construction of Frame

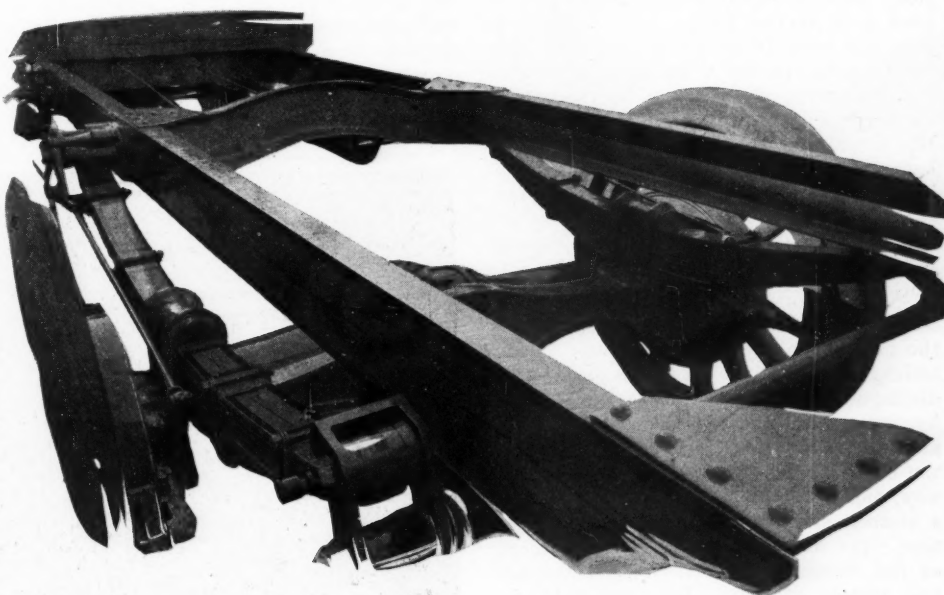
The frame is heavy channel section 5 in. deep bottle-necked to permit a short turning radius. It is reinforced with gusset plates. Springs are semi-elliptic, the front being 2½ in. wide, 38 in. long, while the rear are 2½ in. wide and 56 in. long. This is said to give ample flexibility whether the truck is loaded or not. The springs are attached to the axles by means of clips fitted over circular saddles. The front axle is conventional I-beam construction, spindles being fitted with Bower straight roller bearings. The rear axle is a celfor internal-gear type, with solid axle to carry the load and live axle to transmit the power. An M & S differential is used, permitting full pulling power on one or both wheels. The propeller shaft is tubular with two universal joints of the telescoping type. The latter are oil-tight, dust and water proof. Wheels are artillery type, with square wood spokes, the front ones being 1¾ in. and the rear 2 in. square. Each wheel has 14 spokes. Tires are solid pressed on, the front being 34 by 3½ and the rear 34 by 5. On model L the tires are 34 by 4, front, and 34 by 6, rear. Brakes are conventionally located on large drums, service brake being contracting and emergency brake expanding. The parts are interchangeable—in other words, there are no right or left-hand parts. A Gemmer steering wheel is used of the irreversible type, with inclined column and 18-in. wheel. The front fenders are one-piece heavy steel,



Side view of Hawkeye truck, showing comfortable position of steering column and roominess of driving compartment. The wheels use square spokes and solid pressed-on tires



Engine of the Hawkeye truck fitted with Duplex governor to control the speed. The fan is ball bearing and attention is called to the clean manifolding and general accessibility

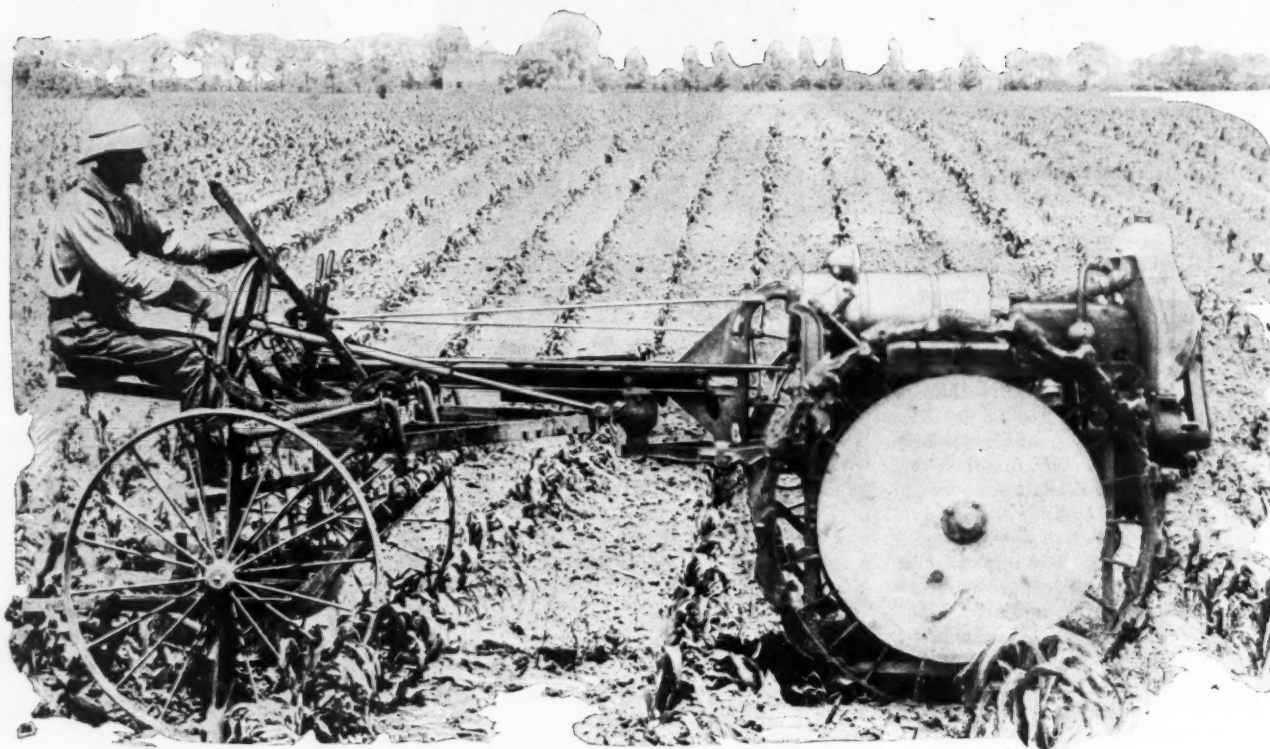


Rear end of Hawkeye truck, showing the sturdy frame construction and circular saddles used for mounting the rear springs to axle. Attention is called to the heavy cross member where front ends of the springs are fastened

rigidly braced from the frame. A short running board extends rearward supported by two rigid braces. Equipment includes

two gas headlamps, two oil lamps on dash, taillight, mechanical horn, jack and complete set of tools.

New Moline-Universal Electrically Equipped



Model D, designed for corn cultivation as well as usual work, has electric starting, governing and lighting

A TRACTOR with a powerful, four-cylinder, valve-in-head engine, all of whose moving parts are inclosed; with complete electrical control, governing, ignition, starting and lighting; with clutch, transmission, differential and final drive completely inclosed and mounted on twelve Hyatt roller bearings running in oil baths; with a differential lock to assist in traction; with a differential brake which is used as a service brake and to assist in steering; with 18 hp. at the belt and with the capacity to full 2 14-in. bottoms at a plowing speed of $3\frac{1}{2}$ m.p.h., is the contribution which the Moline Plow Co., Moline, Ill., is making this year to the cause of better agriculture. The tractor which combines all these important and desirable features is the new model D Moline-Universal, 20,000 of which will be built this year in the largest exclusive tractor factory in the world.

The new model D Universal preserves the two-wheel principle which has characterized Universal models in the past, but is distinguished from its predecessors more by radical points of difference than by points of similarity. Indeed, it resembles the older models in only the most general way, and in almost every particular marks a distinct advance in design and construction. The new model D drives and steers, as did former Universal models, through two wheels of 52-in. diameter and 8-in. face, with a tread of 56 in. to the outside of wheel rims.

It weighs 3,380 pounds, 98 per cent of which is on the front wheels and only 2 per cent, or about 67 pounds, on the implement hauled. It retains also the high clearance which permits the use of the Universal in

the cultivation of corn and other row crops. The new tractor has been thoroughly tested out in all conditions a tractor is called upon to meet and it has met every test successfully. The company offers it to the trade in the confident assurance that it will meet every requirement on the diversified farm.

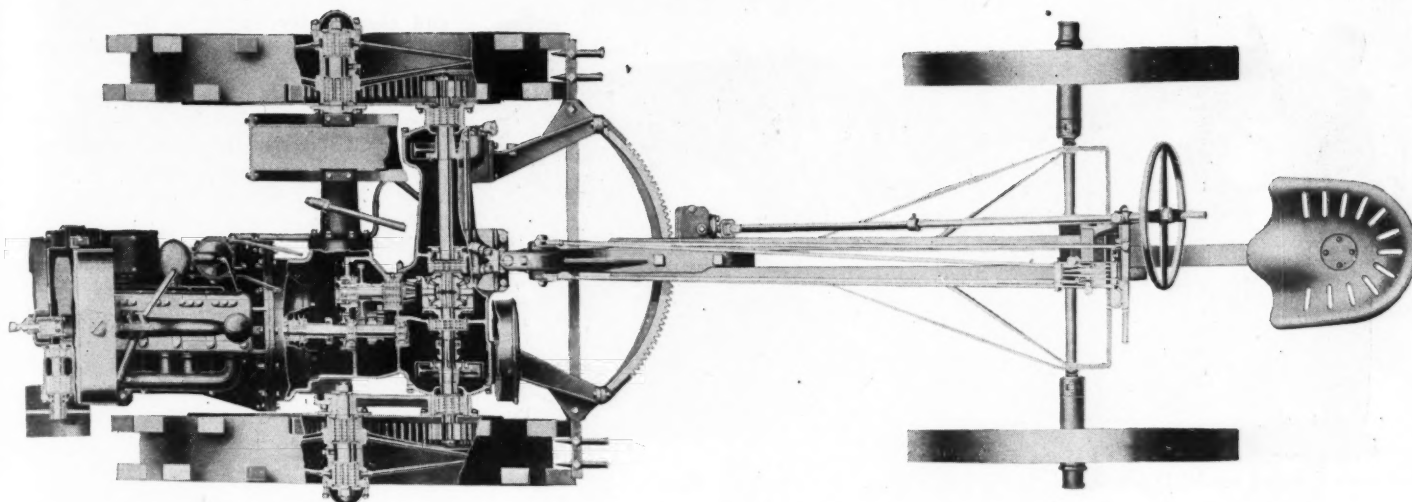
In designing and equipping the model D the company has had in mind the needs of the average farmer. For instance; the average farmer cannot dispose of his horses even after he has purchased a tractor because he needs them for corn cultivation. As shown in the illustration, the Universal

will cultivate corn. The engine is set to one side out of the line of vision of the operator who at all times can see what he is doing, and the high clearance enables the farmer to cultivate his corn until time to lay it by.

Also, there comes times when it is necessary for the farmer to work his tractor at night. Regular equipment on the Universal includes an electric searchlight for lighting ahead, and a spotlight which illuminates the implement being pulled. These are shown in the illustration of the night scene. In short, in designing the model D the Moline Plow Co. has endeavored to build a



Plowing at night with searchlight and spotlight



Airplane view of Model D Moline Universal, showing relative position of engine, transmission and final drive, with universal truck and steering device

tractor which will enable the farmer to motorize his farm with the least disturbance to his methods and his habits and without compelling him to learn new tricks. It is this extreme practicality of the Universal which appeals. Also motor car practice has been followed throughout the construction in the use of alloy steels, cut gears and the like.

As stated before the model D Moline Universal retains the distinctive two-wheel drive, power being transmitted from the engine through a disk clutch, a sliding gearset to transverse axles terminating in bull pinions, which in turn engage with an internal bull gear inclosed in a dust-proof housing on the bull wheels. This transmission reduction is such that with 52-in. bull wheels the tractor travels 2.8 m.p.h. at an engine r.p.m. of 1400, 3.2 m.p.h. at a r.p.m. of 1600 and 3.5 m.p.h. at a r.p.m. of 1800, the maximum speed of the engine.

Control is from a seat on the truck which provides the rear end suspension, or from the seat of any piece of equipment which is substituted for the truck. Attachment of the tractor to operative equipment is by means of a universal attachment, especially designed for use with the farm operative equipment manufactured by the Moline Plow Co., and which is one of the distinctive features of the machine.

Steering is by means of a wheel with extension rod engaging at the tractor end through bevel pinions with a rack of large radius which is a part of the frame of the tractor. Steering is assisted by the use of internal expanding brakes on the bull pinion shafts, described hereafter.

The Engine

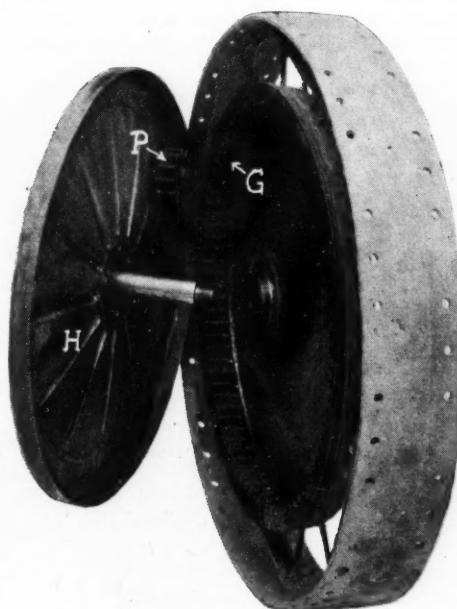
The engine is a four-cylinder, valve-in-head, of the company's own design and construction and has a bore of $3\frac{1}{2}$ in. and a stroke of 5 in., with an electrically governed speed of from 400 to 1800 r.p.m. All engine parts are inclosed and are lubricated through the engine lubrication system. The cylinders and the upper half of the crankcase are cast in a block, with a complete water jacket all around each cylinder. The main crankshaft bearings are held in this block and insure the working

relationship of crankshaft, pistons, connecting rods and cylinders.

The engine is suspended from the transmission case by a large flange at the rear of the engine block and the lower half of the crankcase, which is rigid and well braced, and which is bolted to a similar flange on the clutch housing. The engine has no other support and projects from the front of the tractor far enough beyond the periphery of the bull wheels to provide room for the pulley and pulley shaft.

The valve block is bolted to the engine block. The upper cover, which incloses the valve springs and rocker arms, is bolted above the valve block. This completely incloses all engine parts, yet leaves them readily accessible. In fact, accessibility of all parts is a distinct feature of the model D.

The valves are half the diameter of the cylinders and are of chrome nickel alloy.



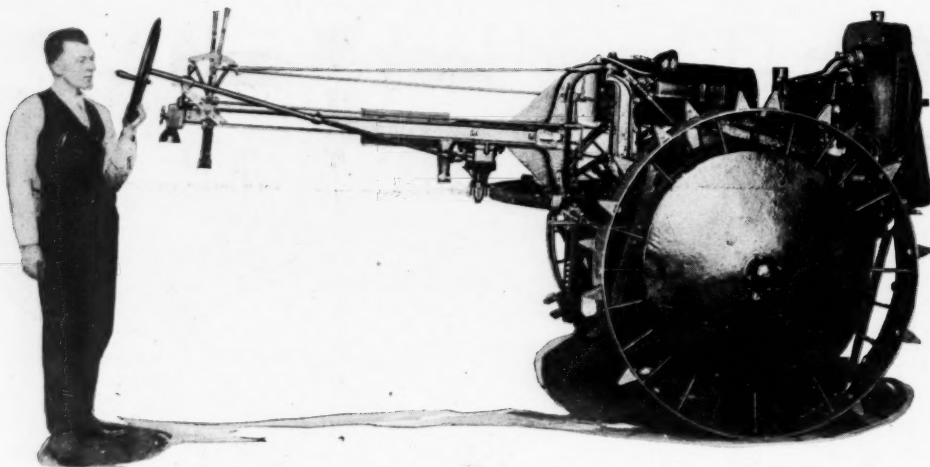
Bull gears completely inclosed.
P, bull pinion; G, bull gear; H, inner housing

Double valve springs are used. The tappets and push rods raise only one-half the valve lift, the lift being doubled by the rocker arm which works on a hardened and ground ball-and-socket joint.

The crankshaft is unusually large compared with the cylinder bore, being $2\frac{1}{2}$ in. in diameter. There are two main bearings, which are $2\frac{1}{2}$ in. diameter and with a combined length of $5\frac{1}{8}$ in. This permits the use of a much shorter crankshaft and operates to reduce engine vibration to a minimum. The connecting rods are drop-forged with $2\frac{1}{2}$ in. bearings on the crankshaft ends. Bearings are bronze backed, nickel babbitt and are readily accessible and easily taken up. Connecting



Gearset of model D Moline Universal.
A, bull pinions; B, internal expanding brakes on bull pinion shafts; C, differential brake; D, differential ring gear



Side view of model D Moline Universal, showing angle irons on drive wheel which support bull gear, outer bull gear housing and distribution of weight

rod bolts are large size alloy steel and are held in place by castellated nuts.

Pistons are of special gray iron, light in weight and together with their connecting rods are weighted and balanced to insure equal inertia and smooth running. Piston pins are hardened alloy steel, ground to size. They are clamped firmly in the connecting rod and turn slightly in the piston. The bearing thus being at the outer end, ample lubrication is assured.

The camshaft is a 1½-in. diameter piece of drop-forged steel with cams forged integral, all hardened and ground to shape. The camshaft is mounted on three bearings and driven by helical gears.

Valve tappets, push rods, rocker arms and valve stems are completely inclosed and lubricated by an oil mist—a distinctive feature of the model D. They are readily accessible by the removal of the cover block and are easily adjusted, as shown in the illustration.

Cooling

Cooling is by thermo-syphon, with Moline-Spirex radiator, cooled by large four-blade fan. The water passages are unusually large, as will be noted by reference to the illustration.

The lubrication is a full force feed, hollow crankshaft system, carrying oil to all bearings under 35 lb. pressure. The oil pump is driven from the back end of camshaft. The crankshaft is bored throughout its length, through which oil is forced in a constant stream. A feeder hole is drilled into all connecting rod and crankshaft bearings. Oil is carried to the camshaft bearings through a lead pipe. The theory is that a constant stream of oil flowing around the bearings carries all heat away and keeps them cool. Oil is thrown from the rapidly moving crankshaft in the form of a mist which lubricates all parts of the engine. The model D burns gasoline and is equipped with a Holley carbureter and a Bennett air cleaner.

Transmission

The gearset is inclosed in a rigid, one-piece, gray-iron housing which holds bearings and shafts in alignment. All gearset, differential and bull pinion shafts are splined. There are seven splines in the transmission and one pinion integral with its shaft, with eight Hyatt and two high-duty ball bearings.

The differential is of bevel pinion type,

self-contained, with four bevel pinions on the central spider and two large bevel gears, one on each side, splined for the differential shafts. On the outer splined ends of the differential shafts are the bull pinions. The bull pinion ends of the differential shaft are carried on Hyatt bearings, lubricated by grease cups. The differential is mounted on Hyatt bearings which run in oil.

A special feature on the model D Universal is the differential lock, shown in the accompanying illustration. This locks the differential shaft to the differential housing and makes the two bull pinions revolve as if on one solid shaft. The operation of the lock is controlled from the seat. This feature enables the operator to throw the entire load on either wheel, or to increase the pulling capacity by dividing the load between the two wheels in footing where one wheel might slip.

On the differential shafts, between the bull pinions and the differential, are internal expanding brakes, completely inclosed and controlled from the seat. They operate independently. By pushing forward on the brake lever, the right brake engages and the tractor turns in that direction. Pulling back on the lever engages the left brake

and the tractor turns in that direction. This facilitates steering and permits quick turns on loose ground.

The clutch is a Borg & Beck and is located on the flywheel. It has two asbestos mats which are clamped to a single disk which drives the clutch shaft. It can be adjusted easily through a hand-hole in the transmission case.

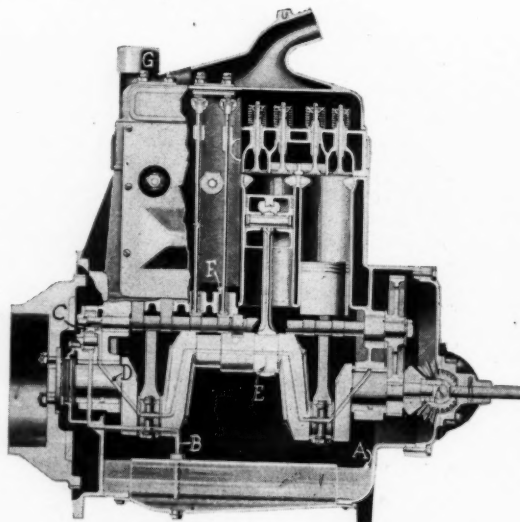
The final drive is a hardened steel spur tooth bull pinion working on a semi-steel internal bull gear. The internal gear is fastened to the rim of the bull wheel by heavy angle iron braces, transmitting the driving power directly to the rim of the wheel and the bull gears are completely inclosed. The outside edge of the internal gear is grooved, as will be noted in the illustration and the turned-over edge of the inner shield fits over so that grease oozing out past the teeth of the bull gear gets into these grooves and makes a dust-proof seal between the bull gear and the inner shield.

Wheel Level

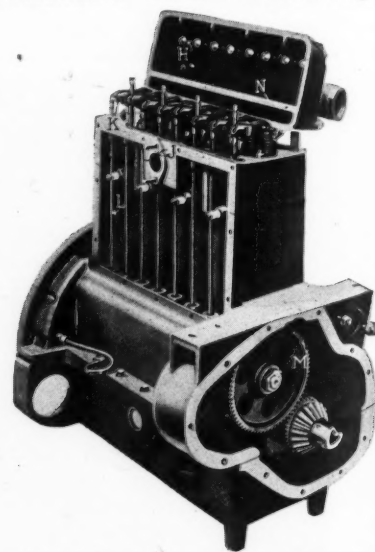
A unique and distinctive feature of the model D Moline Universal is the device whereby the bull wheels can be leveled while plowing. By means of this the axle of the land wheel can be raised about the depth of the furrow so that the tires of the wheels will be flat on the ground at all times. The simple mechanism by which this is accomplished is illustrated herewith. An axle radius bar extends from the bull pinion shaft to the bull wheel axle.

This is held in normal position relative to the side clamp, shown in the illustration in front of the bull wheel axle, by a ratchet which fits into a notch in the side arm. To raise the wheel the lowest and the middle nut on the side arm are loosened and the ratchet knocked out of the notch with a wrench. The wheel then will rise so that the bull wheel axle will be near the top of the side arm.

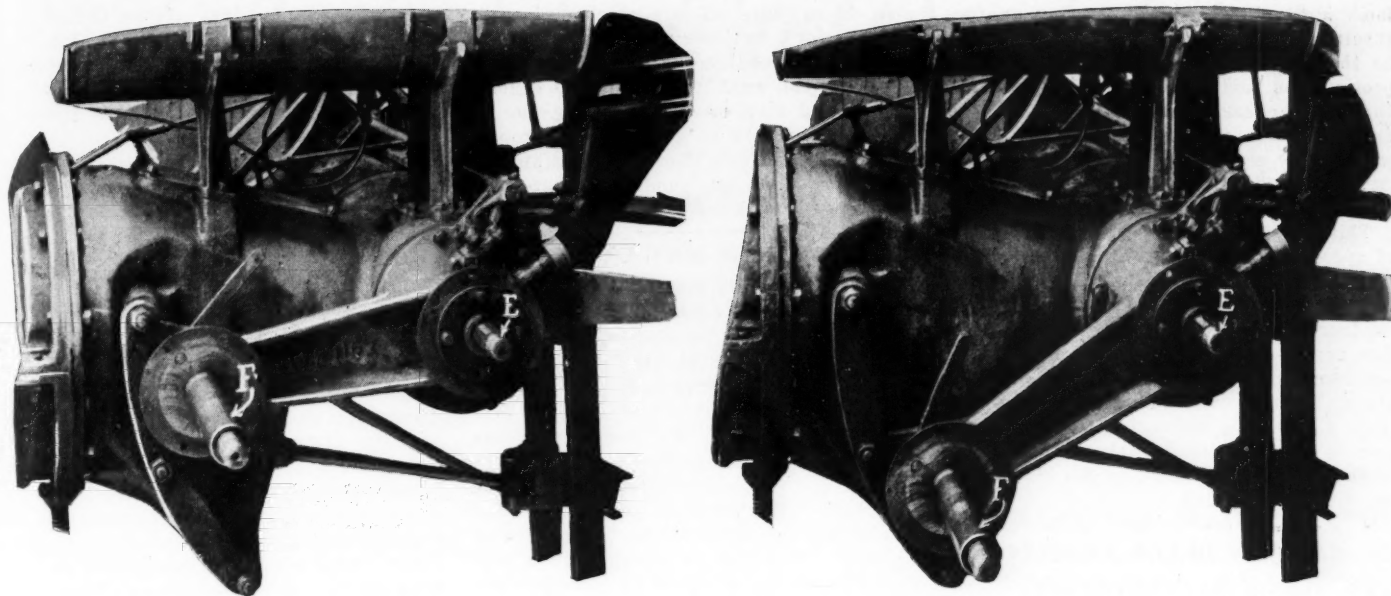
To lower the wheel the process is reversed. The illustrations show the two extreme positions of the axle. This shifting merely changes the angle which the radius drawn through the center of the bull wheel axle to the rim of the bull wheel through



Cross section of engine. A, oil level in crankcase; B, suction pipe to oil pump; C, oil pump; D, oil path through drilled crankshaft; E, oil lead to crank pin bearing; F, valve tappet; G, oil filler cap



Valve mechanism. H, hardened ball of ball and socket joint of rocker arm; K, rocker arm; L, pushrod; M, camshaft gear; N, valve stem and springs



Relative position bull wheel and bull pinion shafts on shifting device for leveling bull wheels of Moline Universal tractor. E, bull pinion shaft; F, bull wheel shaft

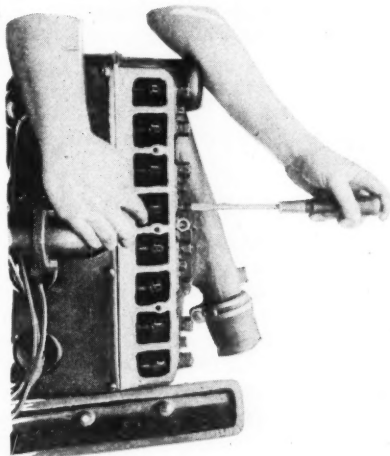
the center of the bull pinion shaft makes with the horizontal.

Electric Control

A DISTINCTIVE feature of the model D Moline-Universal is the complete electrical control. This includes ignition, governing, starting and lighting. Remy equipment, with Willard storage battery, spring mounted, is used. The illustrations herewith show the entire equipment, with detail of the governor generator.

The governor generator controls the engine at any speed the operator may desire and at the same time produces the current for ignition and for charging the storage battery. Current from the battery operates the starter and lights.

A control box in which are housed the combination lighting and ignition switch and the generator field rheostat, and which also has a dial for governing the engine speed, is located beneath the steering wheel within convenient reach of the operator.



Sight plate on cover block removed to show ease of adjustment of valves

The engine speed is governed by setting the indicator on the dial. Positions are marked from 1 to 10. At Position 1 the

governed engine speed is approximately 400 r.p.m., while at Position 10 the maximum speed of 1800 r.p.m. is attained.

Any engine speed indicated by the dial will be maintained because if the engine speeds up, due to decrease in load, the magnetic pull of the field on the armature is increased, causing the field frame to turn and close the throttle. But if the engine slows down due to an increase in load, the magnetic pull of the field on the armature is decreased, allowing the field frame to be turned by the spring in a direction opposite to the rotation of the armature, thus opening the throttle.

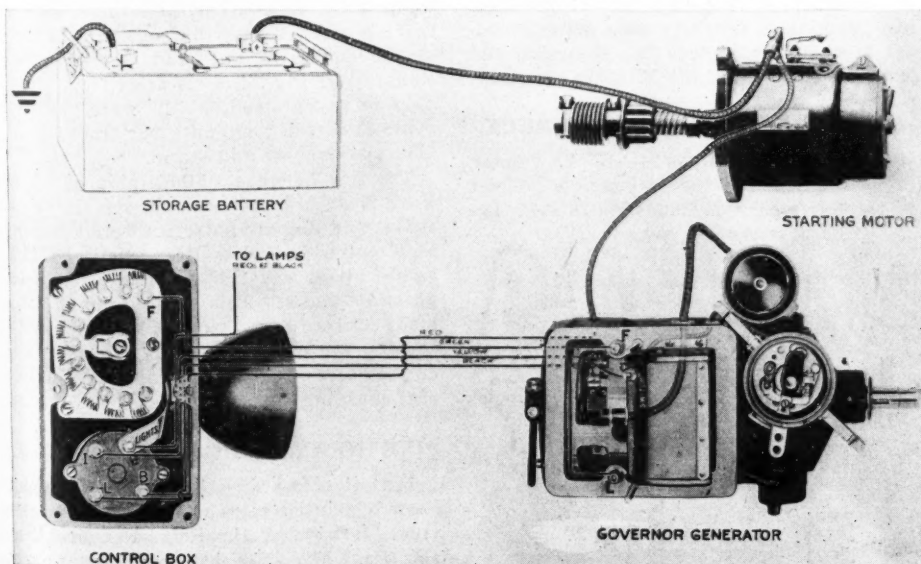
A Bendix transmission is used automatically to engage and disengage the starting motor with the engine flywheel. The extended shaft of the starting motor carries a hardened steel sleeve upon which is cut a screw thread. Operating upon this sleeve is a steel pinion having a lateral travel of about $1\frac{1}{2}$ in. for engaging the gear teeth on the flywheel. A helical steel spring serves as a flexible coupling between the starting motor and the engine, and absorbs practically all shocks.

When the starting motor is supplied with current, its armature being free, starts to revolve at a high rate of speed. The pinion, by reason of its counterweight, tends to lag behind the rotation of the shaft, whose screw thread thus draws the pinion into mesh with the gear teeth of the flywheel. But as soon as the engine starts firing, its increased speed threads the pinion back in the opposite direction, thus disengaging the starting motor from the engine.

Regular equipment on the model D includes the searchlight, which can be pointed in any direction, and also the spotlight for illuminating the implement being used.

PUBLISHES ANNUAL TRUCK BOOK

Akron, Ohio, May 24—The 1918 edition of the annual truck book, "Motor Trucks of America," published by the B. F. Goodrich Co., is now ready for distribution through the company's branches. This



Remy electrical installation of model D Moline-Universal

book is for the benefit of truck manufacturers, their agents and salesmen, as well as the prospective buyer of trucks. The photographs and specifications shown are furnished, checked and approved by the manufacturers themselves and are accurate. They are also so arranged as to permit of easy and instant comparison of the details of any two makes of trucks.

This edition, which is the sixth, will be of special value at this time, by reason of conditions brought about by the war. Never before has the commercial demand for trucks been so insistent. With production running full blast to provide for the requirements of the United States and our allies, business men are turning to the truck to speed up deliveries, while the congestion of the railroads makes it necessary to depend more and more on the trucks for long-distance hauling.

GAS LOW IN LOS ANGELES

Los Angeles, May 24—This city, which claims more motor cars per capita than any large city in the world, is to be the last to feel the gasoline price increase which now is becoming effective throughout the East. There will be a raise here, however, experts point out as the result of the increase in the price of crude oil of 80 cents per barrel since the price of gasoline, which retails at 20 cents a gallon, was raised.

Conditions on this coast are said by refiners to be responsible for the comparatively low cost of gasoline here. Tremendous quantities of gasoline have been stored here because there were not enough ships and tank cars to carry it away. Storage tanks have been at a premium and in some cases production was curtailed, because of lack of storage.

Even with an advance, Los Angeles will be burning the cheapest gasoline in the country, say the oil men, and point to such prices as 28 cents a gallon in Pittsburgh and Philadelphia. The surmise is current here that when gasoline starts to increase it will be gradually until the 25 cent mark is reached. The use of synthetic gasoline, recently permitted here, will not influence prices or production, according to refiners.

GOOD NEWS FOR THE BOYS!

Philadelphia, Pa., May 24—A plan has been proposed to label the majority of passenger motor cars in this city in such a manner as to invite soldiers, sailors and marines to use them. The proposition now is being placed before the various motor clubs in the Philadelphia district. The

plan is to place on windshields placards bearing such an inscription, for instance, as: "Uniformed men: This is your car whenever you want it." Under the scheme an enlisted man or officer, seeing one of these cars, would be at liberty to stop it and ask for a lift. The movement started because of the large number of uniformed men away from home.

IOWA LAW MAY CHANGE

Des Moines, Iowa, May 25—The retrenchment and reform committee of the Iowa state legislature is considering changes in the Iowa motor vehicle law to be proposed at the next legislative session. One important minor change proposed at this week's session of the committee was the method of issuing number plates. At present the plates are issued on a three-year basis. The proposed plan would have cars retain the same number from date of registry. This change would mean a considerable saving in plates and also prevent confusion resulting in removal of plates.

It was proposed further to change the law as regard delinquents in paying fees. Under the present law the secretary of state is required to make out a list of delinquents in May of each year and send them to the county attorneys of the various counties for collection. The new plan would send the list of delinquencies to county sheriffs with instruction to collect or seize the cars.

MARWIN QUADRUPLE-DRIVE TRUCK

Kenosha, Wis., May 27—The Marwin Motor Truck Co., organized recently with headquarters at Kenosha, Wis., is completing the retooling of the former plant of the Skidd Mfg. Co. here, for the manufacture of a quadruple-drive truck for which the Government is stated to have placed a large order. The name, Marwin, is composed of the first syllables of the name of Martin P. Winther, president and chief engineer of the Winther Motor Truck Co., Winthrop Harbor, Ill. Officers of the Marwin company are: President, William Martinson, Kenosha; vice-president, A. F. Williams, Kenosha; secretary-treasurer, Henry Lundskow, Kenosha. Martin P. Winther is chairman of the executive committee. Mr. Martinson formerly was superintendent of the Nash Motors Co., Kenosha, and is works manager of the Winther company.

PALMER HEADS COLLIER TRUCK

Bellevue, Ohio, May 24—R. A. Palmer, organizer and director of business policies of the Cartecar Co. from 1905 to 1912, has

been elected president of the Collier Motor Truck Co. Associated with Mr. Palmer is John F. Cool, formerly general manager of the Rapid Motor Vehicle Co., Pontiac, and Edwin S. Lewis, who is directing the sales of securities.

The Collier company formerly was located at Sandusky, Ohio, but recently moved to Bellevue, where it will continue the manufacture of $\frac{3}{4}$ -ton trucks. The plant is to be enlarged shortly.

TO UNITE MOTOR RESERVES

Minneapolis, Minn., May 25—W. R. Stephens of the Pence Automobile Co., as major, has been chosen to reconstruct the Minnesota motor reserve recently formed and the Minnesota Service No. 1 in one organization, under jurisdiction of Adjutant General W. F. Rhinow. The reserve members will be uniformed and the organization will transport members of the Home Guard when required as well as Government and state officials on official business in the various districts. This reserve is largely a dealer's proposition, as the units are made up of eight cars of the same make. Eight cars make a squad, two squads a platoon, two platoons a company. Each company will have a captain, two lieutenants, two sergeants and eight corporals. Each company will be enough to take care of a Home Guard company. Minneapolis has four Home Guard companies and four motor corps companies. The motor reserve men will be sworn into service and will have drills and regular duty on occasions.

Le Roy Eschner, president of the Automobile Trade Association, has been named captain of the St. Paul division. Major Stephens will tour the state and form at least a squad in every town. Hennepin County has 400 members of the old reserve and Ramsey county 150 members.

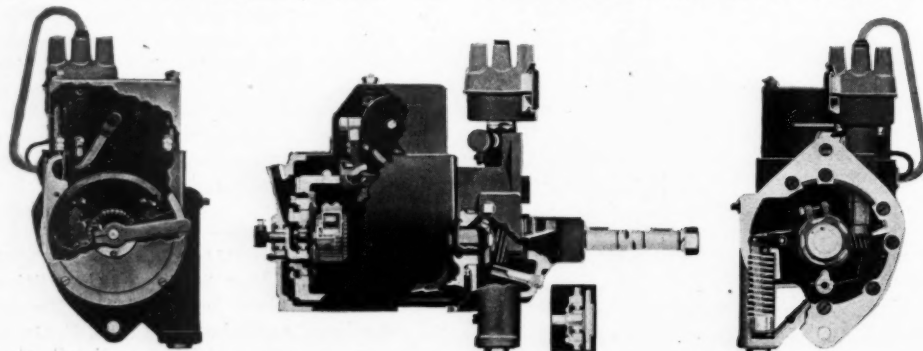
ELECTRIC DRIVEAWAYS

Philadelphia, Pa., May 27—An electric vehicle manufacturer here has made ten driveaways of 5-ton trucks, carrying full capacity, from here to New York. In 1917 forty-two such deliveries were made. Several of these trips were made during the worst kind of weather, and there was no trouble other than pulling gasoline trucks out of snowdrifts and mud. On one occasion two of the 5-ton electrics from Philadelphia to Paterson, N. J., were the only vehicles on the road, all other trucks being held up by snow and storm.

The trip between Philadelphia and New York is an ordinary electric vehicle proposition, and if spare batteries were available at Trenton and New Brunswick the time would about equal that made by a 5-ton gasoline truck. This same company has made driveaways from Philadelphia to Boston, 449 miles, obtaining the necessary current to replenish batteries from the several charging stations enroute.

PIKE HEADS PAIGE TRUCK SALES

Detroit, May 25—Charles S. Pike has been appointed sales manager of the new truck division of the Paige-Detroit Motor Car Co. Mr. Pike has been with Paige two years as director of the sales promotion of passenger cars.



Detail construction of Remy governor-generator on Moline

The Motor Car Repair Shop

WIRING a car is not a difficult job even though there are no old wires to show where the new ones should go. It is a job any owner can do quickly and cheaply.

The diagram shows a car wired for headlights, sidelights, tail light, horn and ammeter, with current supplied by both generator and battery and the lights controlled by a three-button switch.

The return wire system is used, because no provision for fuses was made. However, a single-wire system would be just the same except that instead of return wires the current would pass through the frame.

If there was a starter it should be connected directly to the battery by heavy leads. Its circuit may be considered as entirely separate from the other.

One button of the switch turns on the headlights, another the sidelights and a third the tail light.

Care should be taken in connecting up the generator so that when the engine is running above cutout relay closing speed the ammeter hand moves in the opposite direction from what it does when the engine is stopped and the lights on.

Stranded copper wire about $\frac{3}{32}$ in. in diameter should be used. All wire ends should be twisted firmly together, rather than spliced. All bare wire should be taped so that there will be no danger of moisture or oil getting in, and also to protect the joint mechanically. Keep these two things in mind and there should be no trouble.

In wiring the car it is convenient to proceed as follows: Connect the five lights, ammeter and switch, leaving battery, generator and horn disconnected. With switches open, touch battery leads to battery terminals and note if there is any deflection on the ammeter. If there is, look for a short circuit. If not, fasten the battery leads permanently and then try the lights one by one. The ammeter should read discharge. If it reads charge, reverse the connections at the ammeter or at the battery, whichever is easier.

With all lights off connect one side of the generator and with the engine running at what is estimated to be just a little above relay cutout closing speed connect the other side momentarily. If the ammeter hand moves to charge everything is all right and the connection may be made permanent. If, however, the hand moves to discharge reverse the connections at the terminals of the generator.

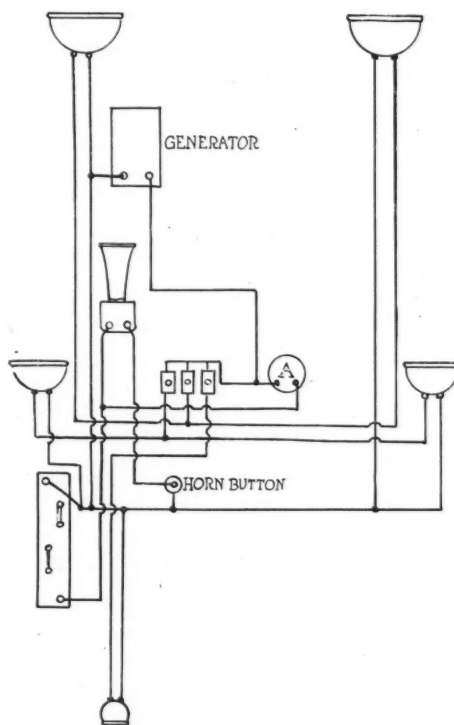
Handy Garage Devices

An electrician and mechanic of the Hartford, Conn., branch of the Willys-Overland Co. has proved to be a resourceful person on numerous occasions. Some of the devices which he has made use of have cut down the time for repairs materially and added to the efficiency of his department. Among other tools he has made frequent use of soldering irons, especially when working on switch board and block connections. This process struck him as being slow and accordingly he got up an elec-

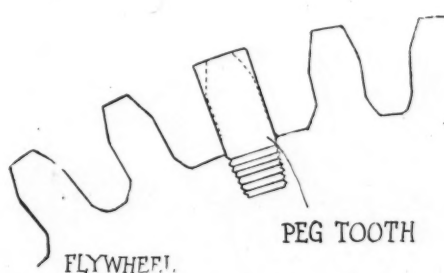
Hints on Wiring a Car and Other Timely Repair Notes

trical soldering iron. Two pieces of insulator cable, a three-cell 6-volt storage battery, a small piece of carbon and a file handle were combined in an efficient instrument. When he now has need of soldering connections and making new joints he simply presses down on the connections, thus closing the circuit. The carbon heats up red and in the wink of an eye the drop of solder is melted away. By means of this simple equipment he is able to do the work alone, where formerly two men were needed.

Another handy device is a door opener and closer made of two single cylinder bicycle pumps. There are two lines of copper pipe leading to the pumps which are fitted with pistons, one line leading to one end of the pump and the mate to the other end. A small hand lever mounted in a bracket



Wiring diagram, showing how connections are made between lamps, generator, ammeter, etc



Showing how a circular peg is fitted to drilled and tapped hole in flywheel

allows the air to enter one end of the pump and thus cause the piston to travel down the pump, drawing the unlocking bars on the doors. Slight moment on the control handle enables the operator to hold the door in any position. Working the handle in the opposite direction causes the air to enter the opposite ends of the pumps and thus close the doors. The compressed air for the pumps is taken off the main line. The supports for the bases of the pumps are heavy brass hinges. These permit the pumps to oscillate as the doors open and close.

Repairing Starter Teeth

The breakage of starter flywheel teeth is usually due to the fact that the pinion does not mesh closely enough and is therefore preventable. Nevertheless teeth are frequently broken and the usual remedy is the installation of a new flywheel. Not only is there the cost of the flywheel to pay for and the labor to install it, but often the most serious objection is the time the car must be laid up to do the job.

An easy way out of the difficulty is to drill and tap a hole in each broken tooth space and thread in a circular peg. After screwing the peg in so that there is no chance of it coming loose, it should be filed to conform to the shape of the other teeth. The peg should be made of as hard steel as can be readily filed. The harder it is the better it will resist wear. Since the flywheel gear is usually cast iron, and since the peg is steel, the latter's small bearing surface is compensated for, by the fact that the material is harder and stronger. In order that there shall be no danger of the peg coming loose it is desirable to drill and tap quite deep. Also the threads on the peg should be a very tight fit in the hole.

Stopping Gasoline Leaks

Soap is insoluble in gasoline and is an easily available and thoroughly satisfactory substance for stopping gasoline leaks. It may be used for packing threaded joints the same as white or red lead. An unusual repair of a broken gasoline pipe which was effected on the road not only illustrates what may be done with soap but also demonstrates what may be done to prevent a serious delay; it is typical of the sort of repair that enables the motorist to be independent of the tow rope. The pipe broke off straight across due to vibration. A couple of small wood splints were whittled out to use in holding the ends in alignment. Some cord was obtained and thoroughly soaped from end to end. Then it was wound around and around, the soap packing tight between the strands of cord, so that a tight joint was made. A point to remember when making gasoline connections is not to screw up the stuffing nuts on the fittings so tight that the threads are stripped.

The Readers' Clearing House

Conducted by B. M. Ikert

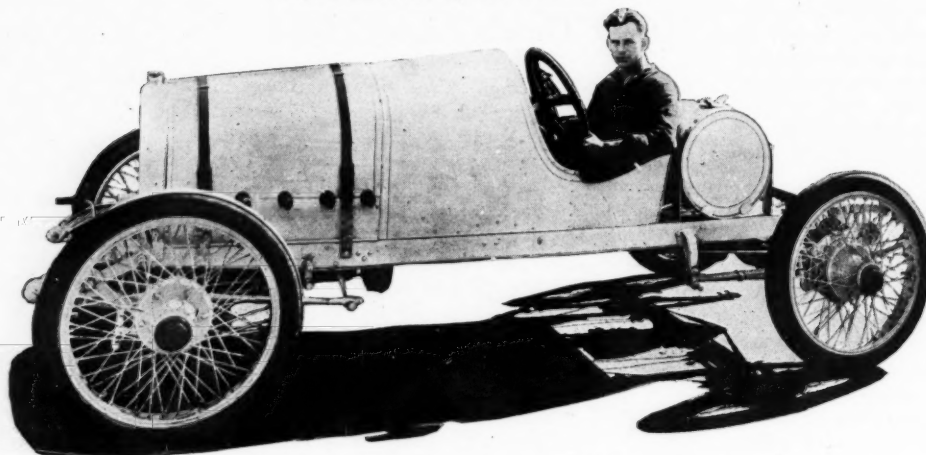


Fig. 1—Speedster body mounted on Overland 75, built by Motor Age reader. Exhaust gases are led through the side of the hood

Engines

Engine Has Metallic Knock

Q.—I HAVE a 1915 Studebaker which has a loud metallic knock under the following conditions. When idling with spark retarded, running over 20 m.p.h. or running downhill. It will not knock when climbing hills, or when under load. It knocks loudest when shorting the third cylinder. Where shall I look for this trouble?—P. D., Chicago.

Your trouble is no doubt caused by loose or sloppy pistons and loose wrist pins. This is in no way serious, but entails quite a bit of work in remedying. The procedure would be to remove the pistons, ream out the wrist pin bearing in each piston and fit oversize wrist pins. If the pistons are worn too much your only remedy would be to have the cylinders rebored and new pistons and wrist pins fitted.

Timing Gears Noisy

Q.—I have a noise in an 83 B Overland engine that is becoming more audible. It is not a knock or a click, but rather a whining noise. I am quite sure it is the timing gears. It is not the generator chain or the valves. If it is the gear, how can I remedy it? Even if I install new ones, will they not be noisy when installed? Is there a way to fix these or any way to install spiral gears? My car has been run about 6000 miles and is in good condition, except for the few things mentioned. When cleaned of carbon, it pulls fine and runs well, but fouls very rapidly, and I thought the carburetor is somewhat to blame for this.—A Reader, Lancaster, Wis.

The best remedy for noisy gears is new ones. They should not be noisy if they are properly installed. We suggest that you get an estimate from some gear cutting concern as to the cost of spiral gears. You will find such concerns advertised in MOTOR AGE.

Oiling of Haynes 20

Q.—Explain the oiling system on my Model 20 Haynes and how can I improve on it?

2.—What is the speed of a Model 20 Haynes if tuned up O. K.?

3.—What is the gear ratio of this car on high? On second? On low?—John Barron, Elkton, S. D.

1.—Model 20 Haynes would be a 1911 car, the oiling system of which is straight splash. The oil is pumped from the bottom of the crankcase or reservoir to troughs beneath the connecting rods and from spoons on the lower half of the bearing is

thrown or splashed to the cylinders and crankshaft bearings. There is nothing that you can do to improve the oiling system on this model. The raw gasoline collecting in the oil is probably caused by too much wear on the valve guides. With tight piston rings about the only chance of gas leakage would be between the valve stems and the guides.

2.—In the neighborhood of 48 to 50 m.p.h.

3.—Three and seven-fifteenths to 1, 7 to 1, 11 to 1.

Engine Starts Hard

Q.—I have an E. M. F. 30, which was equipped with the original Splittdorf ignition low-tension. I took off the Splittdorf ignition, both coil and magneto and installed a Bosch D. U. 4, without coil. At times it is very hard to crank. I have a good Willard battery. Advise a way that I can connect my battery to the magneto to make cranking less difficult.—A. Throckmorton, Muskogee, Okla.

It is not possible for you to connect a battery to the magneto, as this instrument is of the high-tension type and current is generated directly in the magneto, without the aid of a separate step-up coil. Your hard starting may be due to other reasons than the magneto. For instance, if you have the old carburetor with which the car was originally equipped, the engine is sure to start hard, as that carburetor was meant to handle fuel of considerable different

gravity than the present. Our advice would be to make sure you are using an up-to-date carburetor and see also that your manifold is not too long.

Hard starting can very often be traced to poor compression, and an engine as old as yours may be quite leaky, owing to the cylinders being worn out of round. The remedy here would be to regrind them and fit oversize pistons and rings. Check up on the valve timing also. Wear in the tappets, cams, gears, etc., throws out the valve timing eventually and such items must be remedied before an engine will start easily. Do not have too wide a gap at the plugs, as the sparks will have a tendency to burn away the electrodes and gradually increase the gaps. Look at the interrupter points and make sure they do not stick. Examine also the brushes on the collector ring; see that they bear properly and are not covered with foreign matter. If your magneto is an old one it may be that the magnets need recharging. It goes without saying that the interrupter points should be in correct alignment and have the proper opening, in this case about $\frac{1}{16}$ in.

Removing Hudson Pistons

Enid, Okla., Editor MOTOR AGE—I notice in one of your recent issues an inquiry as to the manner of removing the pistons from

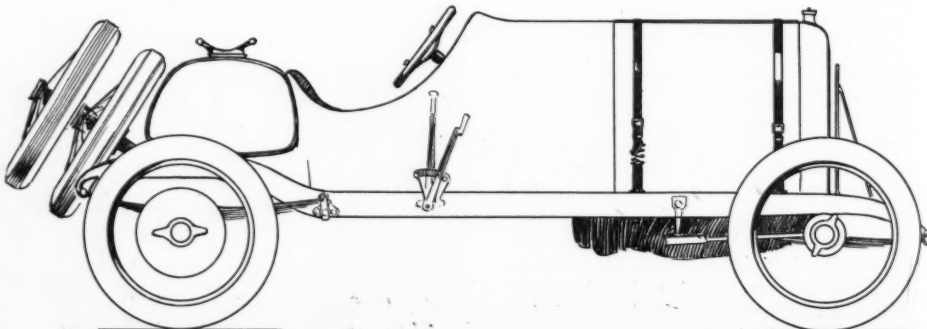


Fig. 2—Suggestion for rebuilding Stutz, using high radiator and 50-gal. gasoline tank in rear

a Hundson Super Six. The proper way to do this is to remove the bottom of the crankcase, disconnecting the rods of pistons No. 3 and 4 and removing the latter through the crankcase by turning the crankshaft to let the pistons clear the counterweights. However, in removing pistons No. 1, 2, 5 and 6 you are forced to take off the cylinder block, as the connecting rod big ends are larger than the bore of the cylinders.—C. E. Van Saun.

Aluminum Piston Clearance

Q.—How much piston clearance is necessary for quiet running on a 1917 Interstate roadster, thermo-syphon cooling? How much piston clearance when fitting aluminum pistons? For ordinary city driving, would the aluminum piston give satisfaction considering the extra expense?—H. Krueger, St. Louis, Mo.

The usual clearance given gray-iron pistons is about 0.003 or 0.004 in. This is for average work and a little more must be allowed if the engine is intended for high speed work. The proper clearance for aluminum pistons is between 0.007 and 0.008 in. on the skirt. The clearance on the ring lands, however, is generally made greater. The top ring land, according to one manufacturer of this type of piston, should be about 0.0012 in. and the second 0.0010. Recent developments have shown that with the pistons properly designed clearances can be cut down to a minimum and consequently the so-called piston slap, noticeable when the engine is started up, reduced to such an extent as to be practically eliminated.

Whether or not the aluminum pistons would help you depends upon the general condition of your engine and how carefully they are fitted. If the cylinder bores are worn out of round or scored they should be rebored by all means. Then if you have the engine tuned as well as possible, you would probably get good results with the aluminum pistons. Some owners who have fitted such pistons state that while they do not get greater car speed, they do get a snappier engine on hills.

Reducing Vibration

Q.—I have a 1910 Cadillac engine which is in good condition. I have installed this engine in an Elmore chassis. How can I reduce the vibration? Is there any way I can counterbalance the flywheel? What is the rated horsepower of this engine? I have a Stromberg carburetor model B. 4, 1 1/4 in. Can this be used, or should a more modern one be installed?—R. H. Coven, Elyria, Ohio.

The reason your engine vibrates may be due to its design, as the reciprocating parts, such as the pistons and connecting rods are quite heavy in the older types of engines. Vibration might be also caused by wear in the parts, especially the cylinders and pistons. Also, if the crankshaft and camshaft bearings are worn excessively, naturally there will be much vibration. Modern tendency is to counterbalance the crankshaft, thus reducing vibration to a minimum. It may also be that the way you have mounted the engine in the Elmore frame has something to do with the vibration. See that it is bolted down tight. Our suggestion would be that if you wish to keep this engine in the car go over it carefully, and fit new bearings wherever needed. It also would no doubt mean new pistons and rings, as well as boring out the cylinders. If you could fit a counterbalanced crankshaft, many of your troubles would be overcome. However, all these

TO assist readers in obtaining as a unit all information contained in this department on a certain subject in which they may be most interested, such as ignition, carburetion, etc., MOTOR AGE has segregated inquiries into classes of allied nature. Questions pertaining to engines will be answered under that head, and so on.

ENGINES

P. D. Chicago
A Reader. Lancaster, Wis.
C. E. Van Saun. Enid, Okla.
A. Throckmorton. Muskogee, Okla.
John Barron. Elkton, S. D.
H. Kreuger. St. Louis, Mo.
R. H. Coven. Elyria, Ohio

REBUILDING

Subscriber. Pulaski, Iowa
T. W. H. Mason City, Iowa
Fujimoto Auto Co. Seattle, Wash.
R. Anderson. Oklahoma City, Okla.

MISCELLANEOUS

E. Byars. Lockney, Texas
George H. Aitken. El Paso, Texas
Harry Bragg. Newark, Ohio
J. P. Colfax, Iowa
Roger Shaw. Hastings on Hudson, N. Y.
I. L. Horton. Omaha, Neb.

THE ELECTRIC SYSTEM

R. W. Pennington. Spokane, Wash.
M. L. Kirk. Memphis, Tenn.

things mean money and an old engine like this one is hardly worth it, inasmuch as most modern designs are very much superior. The flywheel needs no counterbalance.

The rated horsepower of this engine is 30 hp. The carburetor you have was all right in its day, but it is not the thing to use with present day fuels. Better substitute a more modern design, either of the same make, or any other reputable make.

Rebuilding

Overland 75 Speedster

Q.—Publish a sketch of a speedster body for an Overland 75 roadster. Would like to use the present hood if possible, no running boards or fenders.—A Subscriber, Pulaski, Iowa.

In Fig. 1 is shown a method used by one of our readers in reconstructing an Overland 75, which may be of assistance in building over your car. We would suggest that you run the exhaust gases from the

engine into suitable header, from which a pipe can lead to the rear. This prevents the hot gases from striking the occupants and if the pipe is made of the correct length and diameter will help to syphon out the burnt gases.

Scripps-Booth Speedster

Q.—I have a Scripps-Booth which I want to rebuild into a speedster. Publish sketch of this car with tank incorporated into rear compartment and two tires on the rear.—T. W. H., Mason City, Iowa.

In Fig. 3 is shown a side elevation of a speedster body on the Scripps-Booth chassis.

Speedster Body on Stutz

Q.—Draw a sketch of a raceabout with Marmon radiator on Stutz chassis. The wheelbase is 110 in. and the hood is in straight line with the frame. On the rear I want a 50-gal. tank, like that on Stutz racing cars. There are two straps to hold the hood and two extra tires on the rear.—Fujimoto Auto Co., Seattle, Wash.

In Fig. 2 is shown a suggestion for a speedster body mounted on a Stutz chassis, using Marmon radiator. The lines resemble closely those of the Stutz racing car driven by Earl Cooper.

Reader Suggests Speedster

Oklahoma City, Okla., Editor MOTOR AGE
—I am sending a suggestion for a sport car to be published in the Readers' Clearing House, for your readers to criticize. The car is low-hung and carries a spare wheel in the rear.—R. Anderson.

Miscellaneous

Operation of Fordson Transmission

Q.—Show gearing of the Fordson tractor in full.—E. Byars, Lockney, Texas.

A sectional view of the Fordson clutch, gearset and rear axle drive is shown in Fig. 4. By moving the sliding gears on the two transmission shafts, it brings different sets of gears into action. Four speeds are possible, a low, high, plowing and reverse. As shown in Fig. 4 the gears are in neutral, or center position.

The four views shown in Fig. 8 show clearly the different working positions of

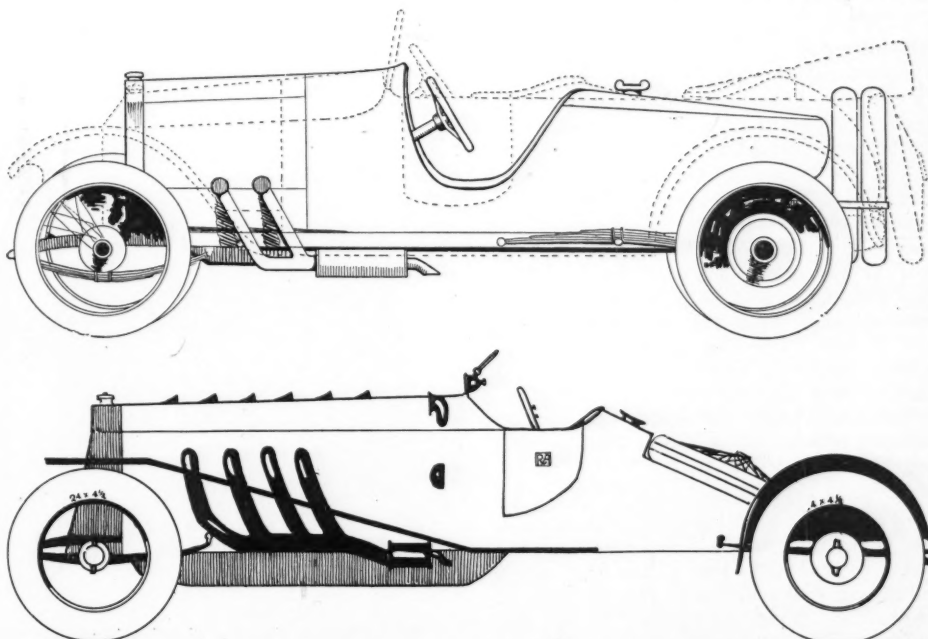


Fig. 3—Above, suggestion for cutting down a Scripps-Booth four-passenger into speedster and below, reader's idea for low-hung speedster, carrying spare wheel on rear deck

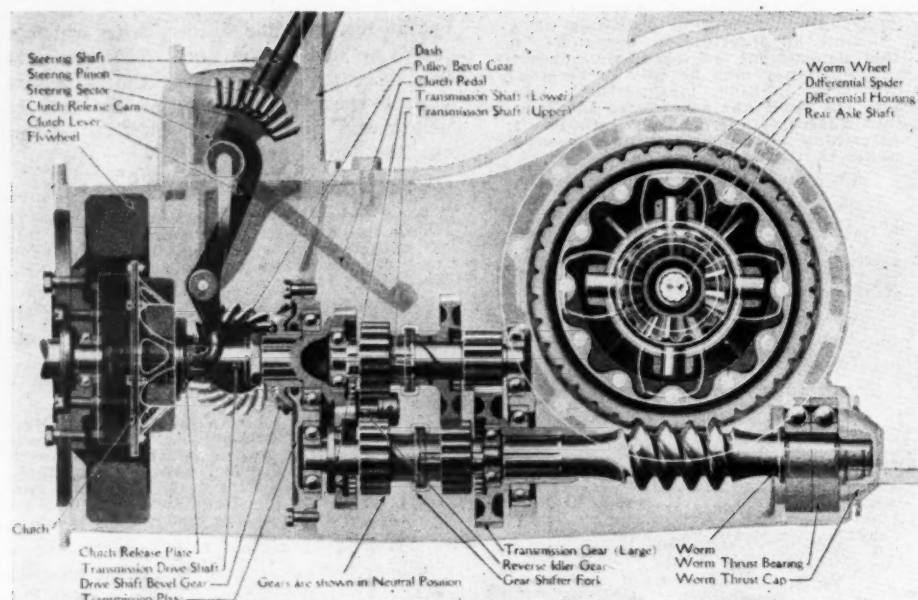


Fig. 4—Fordson tractor transmission and clutch assembly, showing the worm and wheel that drives the rear axle

the sliding gears and the sets of gears they engage. The heavy line indicates the path of the power transmitted. The changes are made by a gearshift lever on the left-hand side of the tractor.

Various Ford Questions

Q.—What is the address of company making the Hub cap wheel shown on page 38 of *MOTOR AGE*, Sept. 27, 1917.

2.—What companies make high narrow radiators for Fords, also worm steering gears and Bosch magneto outfits for Fords.

3.—Could I remove the regular cylinder rims and fit demountable rims on stock wheels?

4.—Is there any way to lower the Ford rear spring for underslinging? Show cut.

5.—Would it harm the Ford engine to remove the regular gaskets and put in light asbestos gaskets to raise the compression?—Harry Bragg, Newark, Ohio.

1.—The Hub cap wheel is made by the Auto Accessories Mfg. and Sales Co., Benton Harbor, Mich.

2.—National Can Co., Detroit, Detroit Radiator & Specialty Co., Detroit, and the Laurel Motors Corp., Anderson, Ind.

3.—While it is possible to remove the clincher rims of the stock Ford wheels and fit demountable rims, it is not advisable. In the first place the wheels are not generally considered of sufficient strength to permit any alteration of this kind. Secondly, the amount of work is so great that a new set of rims with new wheels is cheaper in the long run. We know of one case where the labor for doing this and cost of the rims amounted to something like \$24, whereas the price for a set of rims complete with new wheels was about \$18 to \$20. For this kind of work the wheels should be made of second growth hickory and that is why most of the demountable wheels for Fords are finished natural, so you can see what you are buying.

4.—There are several ways in which the Ford frame can be lowered and two of these are shown in Fig. 6. In one case the frame is sawed off close to the rear spring saddle and two gooseneck brackets made to suspend the frame, as shown. In the second case the side members are cut at a 45-deg. angle and a Z-bracket installed.

5.—It would not harm the engine but the latter would not act quite so well at low speeds on high gear. Also there is some danger of such a gasket blowing out, as the construction is not as good as with the copper and brass variety.

Removing Rear Wheels

Q.—I wish to take the rear wheels of a 1915 Dodge Brothers car to repaint them and clean bearings. Are any special tools necessary and will I have to disconnect all brake connections to do it?

2.—Do the wheel bearings in a Dodge car get enough lubrication from differential and hub caps, or is it necessary to take them off to lubricate?—George H. Aitken, El Paso, Tex.

No special tools are necessary to remove the rear wheels of the Dodge Brothers car. The brake operating mechanism need not

be disturbed in taking off the wheels, which should be done as follows: Remove the drive flange on the outside of the wheel, with drive shaft attached to it. Loosen the clamp screw, unscrew the roller bearing adjustment nut and pull off the wheel. In pulling off the rear wheels the outer roller bearings will come off with them. If you find that you cannot pull out the flange and axle shaft on one side take out the other side and then you will be able to drive out the other axle with a long rod pushed through the housing. Inasmuch as the axle is of the full-floating type the shafts can be removed without jacking up the wheels. However, as you wish to take off the wheels, obviously the car will have to be supported some way.

2.—To lubricate the rear wheel bearings, take off the wheels as above and remove the inner bearings. Clean them and after packing with grease, replace them. Do the same with the outer bearings and the wheels can be put back.

The wheels must be adjusted after they have been removed, as follows: Turn the adjusting nut up tight. Spin the wheel a few times by hand, then back off the adjusting nut enough to allow the wheel to oscillate slightly and then lock the adjusting nut in place. Approximately one-third of a turn will be found sufficient to back off the nuts, both on the rear axle housing and front wheel spindles. Be sure that in each case the nuts are locked properly.

Wants Baby Peugeot Information

Q.—Give general information relative to the Baby Peugeot and if possible show photograph of one.—Roger Shaw, Hastings-on-Hudson, N. Y.

We have no picture at the present time of the Baby Peugeot, but this little car was built on big car lines, so far as its external appearance was concerned. The powerplant comprised a four-cylinder block engine of only 2.1 by 3.5 in. bore and stroke. The valves were on opposite sides and of large diameter; the timing gears in front, with magneto on the intake side having its shaft parallel with the crankshaft. The engine used a Claudel carburetor.

A novel feature was the casting of the cylinder block and whole of the crankcase in one piece. Power was taken through a cone clutch and two-speed gearset through a propeller shaft to a floating rear axle. The rear springs were really the half of a semi-elliptic spring inverted, the thick end being attached to frame and the forward end of the blade to the axle. The car was fitted with wire wheels carrying tires 22 by 2½ in. The car listed at \$800 in 1912.

Oiling Oakland Timing Gears

Q.—Are the timing gears on this model lubricated by hard grease, or does the oil pump furnish the necessary lubrication?—I. L. Horton, Omaha, Neb.

The timing gears of the 1913 Oakland are lubricated by oil coming from the front main bearing.

Hissing Carburetor Noise

Colfax, Iowa, Editor *MOTOR AGE*—In *MOTOR AGE*, May 16, page 36, I find that J. Salkes of Chicago wants to know the cause of the whistling sound in his carburetor. I had the same thing and found the cause was that the carburetor had an air

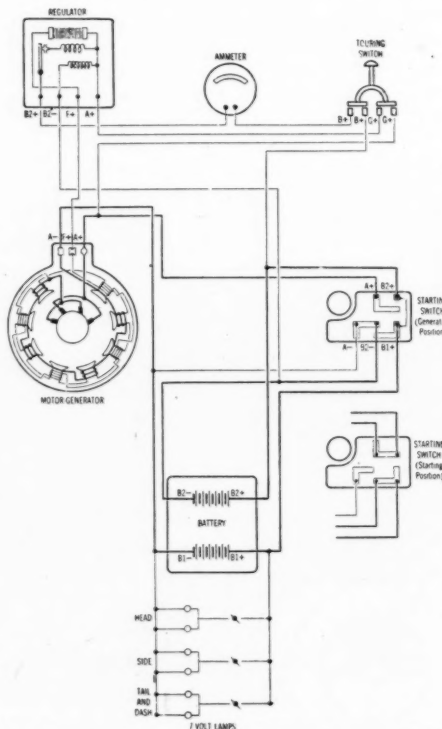


Fig. 5—Wiring diagram showing installation of relay in lighting system of 69 Overland car

leak between it and the engine. When it was closed, the whistling ceased.—J. P.

Doble-Detroit Control Board

Q.—Illustrate the Doble-Detroit controls and instrument board.

2.—What is the horsepower of the Doble-Detroit at 2½ m.p.h.?—M. D. Moore, Mesquite, Tex.

1.—This was shown in the May 16th issue of MOTOR AGE, page 37.

2.—MOTOR AGE cannot give you this information, as much depends on conditions, such as the point of cut-off, etc. In the Doble engine, which is a two-cylinder, single-expansion double-acting engine, the uni-flow principle is employed, to provide high expansion. There is one valve per cylinder, which takes care of the steam inlet while the exhaust passes out through ports uncovered by the piston at the end of the stroke. It is thus possible, it is said, to secure cut-off at 5 per cent of the stroke, if desired.

The Electric System

Adjusting Regulator on Overland 69

Q.—I have a 69 Overland with U.S.L. electrical equipment and cannot adjust the regulator to get the proper results. By getting the relay to cut in, I get about 30 amp. at 15 miles, which I am sure, will be injurious to the battery. I saw a Mercer that had the generator excited from the battery and gave just the results I want, but since the Mercer equipment differs from mine, I could not get much of an idea from it. Publish diagram showing connections.—R. W. Pennington, Spokane, Wash.

The general wiring diagram of this system is shown in Fig. 5. This will give you the correct manner of wiring up the various units, especially the regulator.

It is well before trying to adjust the regulator to understand the functions of the latter. The first function is that of

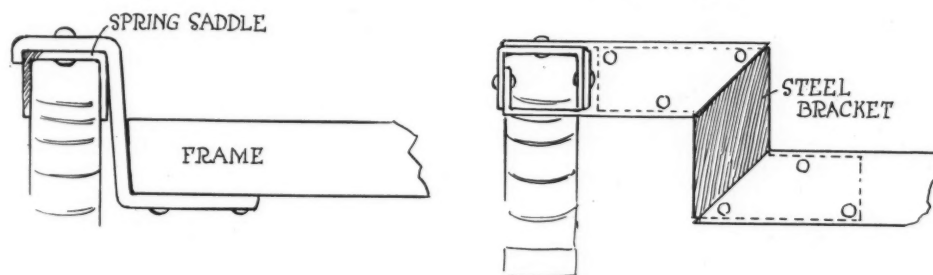


Fig. 6—Two methods of lowering Ford frame at rear. In one case the frame is sawed off and hung up by goose necks, in the other is diagonally cut and a Z-bracket installed

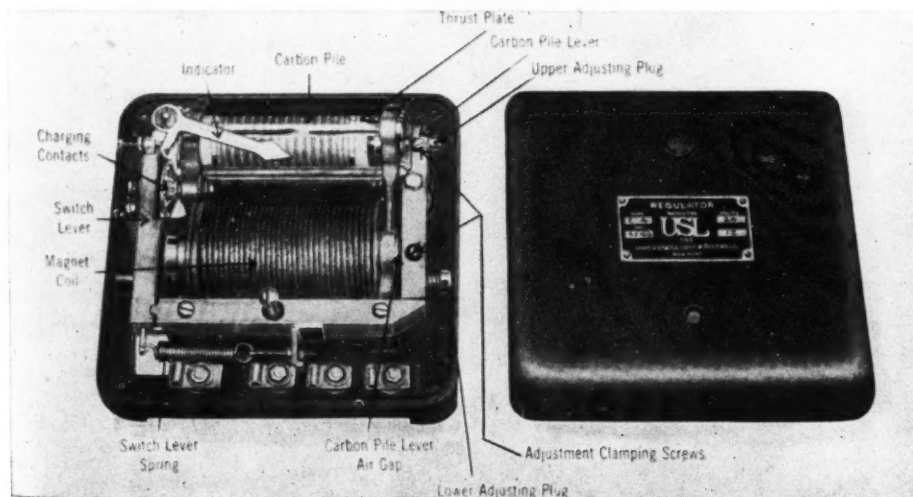


Fig. 7—Interior view of regulator used on Overland 69, showing where the adjustments are made. Current output is increased by screwing in lower adjusting plug

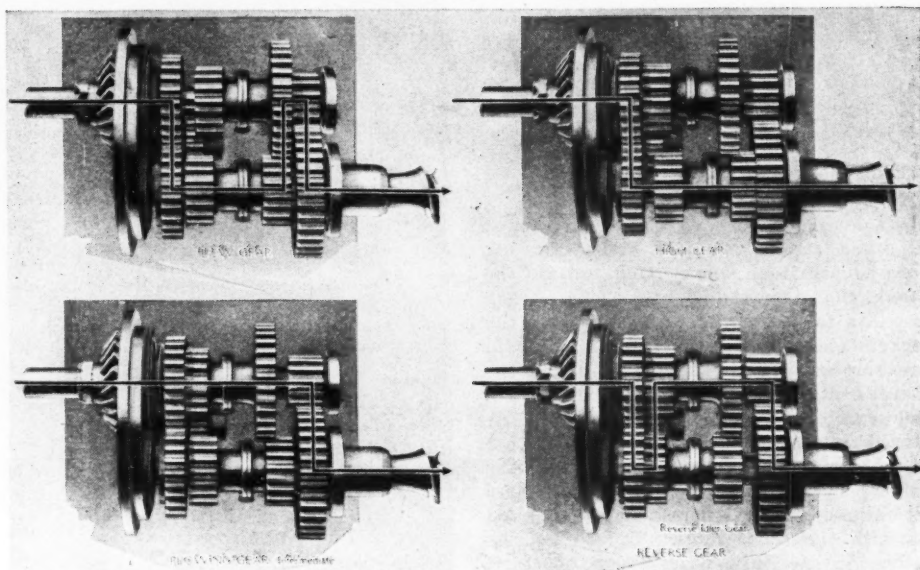


Fig. 8—View showing four positions and different sets of gears engaged when the Fordson tractor is in low gear, high gear, plowing gear and reverse

cutting in or out. When the engine drives the starter at a speed fast enough to be suitable for battery charging the switch lever automatically closes the charging circuit and remains in closed position until the engine slows down. The cutting in speed is that speed of the engine at which the lever closes. The second function is that of regulation, which is to insure proper charging of the battery.

The adjustment of the switch lever is a shop adjustment, and unless tampered with needs no attention. When the lever is correctly set a slight discharge will be noticed

on the ammeter the instant the switch lever opens. This discharge must not exceed 4 amp. If it does, increase the tension switch lever spring by means of a nut at the right hand end.

The adjustments for regulation are made at the factory and in general should not be disturbed. The driver should notice occasionally the current output of generator, as shown by the ammeter, which should not exceed 18 amp., driving at the highest engine speeds. To decrease the current, turn the lower adjustment plug to the left on the carbon pile lever. If necessary to increase the current output turn the plug in the opposite direction. After setting lower adjustment plug make sure that the carbon pile lever air gap is not greater than ⅛-in., nor less than ⅜, when the engine is stopped. After changing the air gap, the current output must be adjusted as above stated.

To test the Carbon Pile hold the steel part of a screwdriver against the two right-hand terminals F + and A + of regulator. Speed the engine up slowly and note whether the regulator cuts in considerable earlier than when terminals are not thus short-circuited. If it does, it shows the carbon pile is dirty and requires cleaning. If the regulator does not cut in under these conditions, it is likely the generator brushes need replacement.

Magneto on 1918 Velie

Q.—What is best method of installing of a D.U.6 Bosch magneto on a model 39-1918 Velie? Would this have any effect toward increasing the speed?—M. L. Kirk, Memphis, Tenn.

The manufacturers of this car do not advise changing the ignition system on this model as it necessitates the mounting of the magneto on the same side as the generator, and this means providing an extra bracket; also changing the generator for one which has a through shaft, using two universal couplings, one between the pump and generator and one between the magneto and generator. It is barely possible that the installation of a magneto would give slightly better results, but not enough to warrant the extra expense of equipment required in making the change.

The Accessory Corner

Sticket Socket Wrench Set

THE new Sticket wrench set consists of a double ended ratchet wrench strapped to seven strong stamped sockets strung on a square steel shank. One end fits the shank, the other the sockets. The wrench also fits four sizes of nuts and with the sockets eleven different sizes of nuts and cap screws. The wrench fastens to the shank full of sockets by a strap and shield. One end carries a ball, which when removed releases the sockets. The other end has a ball stop and spring ball for holding the socket in place. The complete set takes up little room and can be rolled up with the other tools. To reverse the ratchet, it is only necessary to turn it over. Any size sockets are furnished. Price, \$3.—Bay State Pump Co., Boston, Mass.

Kelly-Springfield Cord Tire

Kelly-Springfield cord tires embody the best in modern cord constructions, being fast and exceedingly sturdy. They are said to be perfectly balanced, because the process of their manufacture is according to the established method of tire building in use for many years in Kelly factories. Exhaustive tests of this tire on heavy test cars showed the average mileage of the tires on the front wheels to be 14,000 miles, while the rear tires averaged 11,725 miles. The illustration shows the tread used on this particular tire. Kelly-Springfield Tire Co., New York City.

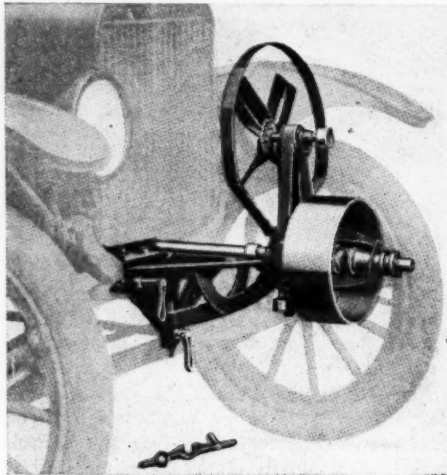
Warner Wheel Lock

The Warner Wheeltilt lock consists of three malleable castings, equipped with a pin tumbler lock. All other parts are of steel. When a driver leaves his car he may lock the wheel in a tilted position, or not. Although the steering wheel may be removed, the steering mechanism itself is completely locked. The lock utilizes the present steering wheel and can be installed by anyone in 15 min. A wrench and screwdriver are all the tools required. A light pull of the latch tilts the wheel instantly. To install the lock the Ford steering wheel is removed, together with gear case cover and the lock cover screwed on. The lower member of the Wheeltilt is put on the steering stem and the wheel on the Wheeltilt stem. Tightening the parts completes the installation. Price \$7.00.—Warner Electric Co., Muncie, Ind.

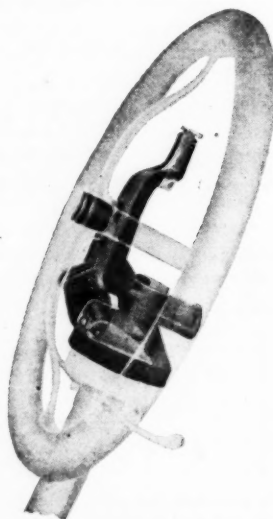
Anderson Adapt-a-Lite

The Anderson Adapt-a-Lite is a universal all-purpose lamp. It is a five-in-one outfit, comprising extension lamp, wall bracket, reading lamp, desk lamp, and table lamp. It also can be readily used in private garages. The real feature consists of a ball casing containing a winding mechanism and drum carrying 10 ft. of insulated cord. The bracket combines a base for use as a table lamp, means for hanging on a wall and clamp for attaching to edge of desk or bench. Price, with key socket, \$3.50. This concern also makes the Auto-reelite, and a motor car windshield spot-

light with automatic extension inspection light. It is furnished with mirror for rear road view. Other articles consist of a portable lamp for machine shops, garages, etc.,



McGill Autopower attachment for Ford



Warner Wheeltilt lock in effect



Kelly-Springfield cord tire

costing \$3.50.—Anderson Electric Specialty Co., Chicago.

Eclipse Valve Grinder

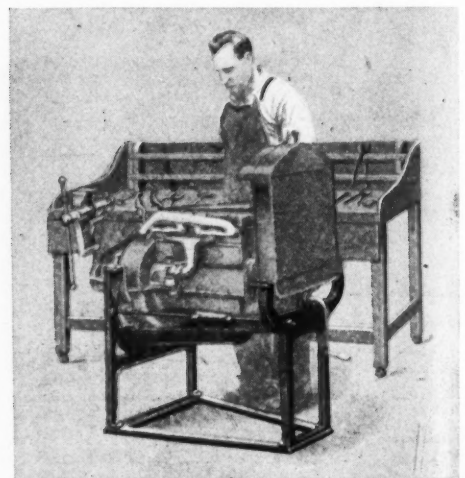
The Eclipse electric valve grinder has been brought out to facilitate grinding valves on V-eights, twin-sixes, and sixteen-valve fours. This machine provides 2,000 oscillating grinding strokes per minute and accuracy is assured by a variable creeping rotary movement said to be an exclusive feature of the Eclipse. The electric motor of this outfit operates equally well on alternating or direct current. The top bearing is provided with a felt oiling system. Complete instructions, seven detachable bits, lifting spring and 7 ft. of extension cord with swivel plug are furnished with each machine. The detachable bits permit the tube to be used on all makes of cars.—Eclipse Valve Grinder Co., Kansas City, Mo.

Automatic Extension Reel

The Automatic extension reel for electric lamps eliminates the necessity of dragging extension cord over the floors of garages, shops, etc., thus preserving the insulation. The drum of the reel is 9 in. in diameter by 2 in. in width and is equipped with 25 ft. of reinforced cord. The head is provided with a swivel joint, enabling the lamp to be carried in any direction from the reel and an automatic lock, so that stop may be had at any point. A slight pull on the cord releases the catch and the cord is automatically rewound as one walks toward the reel with lamp in hand. Price, \$12.—Seng Auto Device Co., Chicago.

American Piston Rings

American hammered piston rings are individually cast of close grained gray iron, assuring a soft velvety texture. The wear, therefore, comes on the ring and not on the cylinder, eliminating the need for reboring. The rings are made concentric and the groove filled all around leaving no pocket behind the ring for oil accumulation and carbon deposits. These rings are made in all sizes with standard and oversize to fit practically all internal combus-



Eco two-in-one service stand

tion engines. Prices range from 75 cents, which is that of a 2½-in. ring, to \$2.75, the price of a single ring for an 8-in. bore. A set of twelve rings for Ford engines costs \$7.50.—American Piston Ring Co., Newark, N. J.

Boston Gears

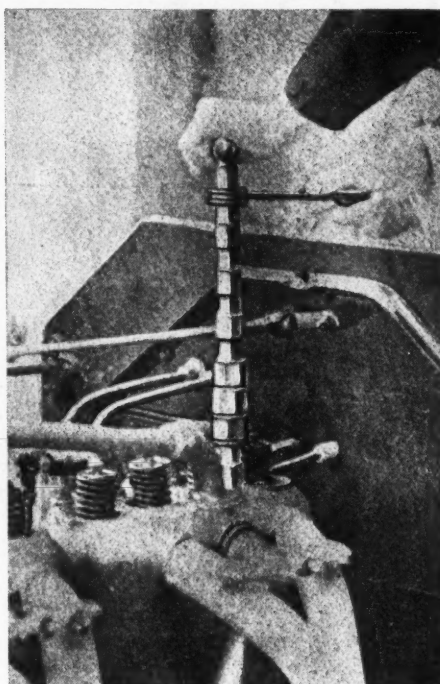
Boston gears are furnished for practically every purpose for which a gear can be used. Spur gears in either brass, iron or steel can be had together with a complete line of internal cut gears, miter gears, worm gears, spiral and helical gears. All gears are furnished with hubs projecting beyond the face on one side only. Most of the hardened gears are key-seated with the whole left soft, for the purpose of rebor-ing if necessary without the necessity of grinding. The company also furnishes a complete line of sprockets and chains in brass or steel, universal joints, thrust collar bearings, cast iron groove pulleys, brass and steel racks, etc.—Boston Gear Works, Norfolk Downs, Quincy, Mass.

Spelter Solder

American brass spelter solder for brazing purposes is furnished in either the long grain or round grain variety. The former can be had from the 100 extra fine grain to No. 105 coarse, while the round grain is furnished from 40 extra fine to 445 coarse. The company also furnishes several alloys of the proper size grain for brass and steel button manufacturers. There is also an alloy which will properly fuse with steel, for use in the motor car industry specially. To accommodate the trade American spelter solder is packed in tin cans in 50-lb., 25-lb., and 10-lb. cans.—American Brass Co., Waterbury, Conn.

McGill Autopower Attachment

The McGill Autopower attachment makes it possible to convert a Ford into a powerplant in about 2 min. time. In this attachment the casting which stays on the car makes a good holder for the license



New Sticket socket wrench

number, the latter at the same time nearly hiding the casting from view. The attachment has an auxiliary fan which keeps the engine cool, under all conditions. A special clutch pulley makes it possible to start the engine and then pull in the load. The pulley is 10 in. in diameter by 4½-in. face. The engine runs at the same speed as running on the road at 20 m.p.h., which is about 1,000 r.p.m. Forty feet of belt should be used for best results. Price, \$60.—Hyslop Bros., Toronto, Canada.

Eco Service Stand

The Eco two-in-one service stand forms a rigid support for engine, transmission and radiator, so the engine may be run by

its own power for trying out before placing in frame. The stand is meant for Ford cars. In addition it holds the entire rear axle unit and any part of the rear axle can be removed, with the remaining parts held in their relative positions. It can be moved to any position in the shop and the grease pan furnished will hold all the oil or grease from the differential housing. There is also a tool shelf easily reached from any position. The stand is made of cast iron and measures 27 in. high, with an overall length of 32 in. The front is 13 in. wide and the back 26 in. The weight is 155 lbs. Price \$27.50.—Western Manufacturing Co., Oskaloosa, Iowa.

Champion Plug Cleaner

The Champion spark plug cleaner makes plug cleaning a comparatively simple job. It consists of a glass tube containing 50 loose hardened steel needles. One end of the tube is open and fitted with a rubber bushing into which a spark plug can be fitted, in exactly the same manner as it is screwed into the cylinder of an engine. In cleaning the plug the tube is half filled with gasoline, the plug inserted and then the device shaken vigorously for a minute or two, whereupon the plug will be thoroughly clean. When the tube is shaken it starts the needles in motion and they peck away at the inner surface of the plug, where the carbon has accumulated. While the needles are doing this the gasoline washes away the accumulation of oil, leaving the plugs in good condition.—Champion Spark Plug Co., Toledo, Ohio.

Firestone Rubber Backed Patch

Firestone Rubber Patch is for quick repairs to inner tubes. The patch comes packed in round containers and includes cement. The material comes in sheet form and varies in length and width. A small sized container is made for the car only and a large size for commercial or garage use. Firestone Tire & Rubber Co., Akron, Ohio.



Left—Eclipse valve grinder. Upper center—Automatic extension reel, left, and American piston ring. Lower center—Boston gears. Right—Anderson Adapt-a-Lite

Among the Makers and Dealers



WAR TRUCKS LEAVE MARION FOR SEACOAST—This is the first convoy of Class B war trucks to leave the plant of the Indiana Truck Corp., Marion, Ind., for the seaboard. The Indiana Truck Corp. is assembling this type of the standardized truck for the Government now

LARGER Tulsa Plant—An addition to the Tulsa Automobile Corp., Tulsa, Okla., is being planned to practically double the company's output.

Output of Republic Trucks—The monthly output of the Republic Motor Truck Co., Alma, Mich., is now 2000, with an additional ten trucks daily for the Government.

Erickson with Standard Radiator—C. A. Erickson, formerly chief engineer for the Scripps-Booth Corp., Detroit, has been made general manager of the Standard Radiator Co., Springville, N. Y.

New Tool Works—The Madison Machine Co. has been organized at Madison, Wis., to manufacture machinery, machine tools and mechanics' tools. The capital stock is \$25,000. E. J. McEachron, Thomas C. Olson and E. A. Fuller are the principal owners.

Wilson to Handle Miller Advertising—B. C. Wilson has become associated with the Miller Rubber Co., Akron, Ohio, where he will handle advertising. He was formerly connected with the Associated Press, in Detroit, later joining the staff of the Martin V. Kelley Co., Toledo, Ohio, advertising agency.

Alien Nickel for Sale—President Wilson has authorized the alien property custodian to sell 279,232 lbs. of nickel at private sale without public or other advertisement. The sale will be held at Tompkinsville, Staten Island, New York, where the nickel is now stored with the American Dock Co. This

nickel was the property of Hammer & Co., Germany, and was taken over by the alien property custodian.

McIntyre with Paige-Detroit—A. H. McIntyre, for the last few years in charge of the wholesale department of the Saxon Motor Car Co. for New England, has accepted a similar position with the Paige-Detroit company at Boston.

Firestone Makes 202 Miles of Patches—If the blowout patches sold by Firestone Tire & Rubber Co. since January 1 were laid end to end they would reach a distance of 202 miles which enormous business is also manifested in the sale of other tire accessories, such as cementless patches, Hook-on boots, etc.

New Republic Rubber District Man—L. E. Browning has been appointed district manager of the Republic Rubber Co. in the mountain states of Montana, Idaho, Utah, Wyoming, Colorado, Arizona and New Mexico, with headquarters at 1546 Broadway, Denver, Col. Mr. Browning was formerly with the Kansas City branch of the above corporation.

New Era Adds Bumper—The New Era Spring & Specialty Co., Grand Rapids, Mich., has purchased the plans, manufacturing rights, machinery and equipment of the Paradee bumper, and has added this to its other manufacturing business. Edward Paradee will superintend the construction. In spite of transportation difficulties the business of the concern is reported to be 50 per cent

ahead of last year. The company has outgrown its present quarters and been compelled to use two frame buildings adjoining.

Kearn as Office Manager—Frank B. Kearn, formerly Australian representative of Willys-Overland, has been appointed office manager of the General Motors Export Co., New York.

New Era Tire Carriers Ordered—The New Era Spring & Specialty Co., Grand Rapids, Mich., has received a government order for 1000 tire carriers to be used on Dodge Brothers ambulances for foreign service.

Fitzgerald with Young Industries—J. W. Fitzgerald, former president of the Detroit Starter Co., who later became president of the Versal Products Co., Detroit, has been appointed consulting and experimental engineer for the L. A. Young Industries, Inc., Detroit.

General Motors Plans New Plant—The General Motors Co. will erect a gray iron plant at Saginaw, Mich. It will be located half a mile north of the company's property now known as the Peninsular Shell Co. Eight hundred men will be employed when the plant is in operation.

Plans Foundry Addition—Plans are now well under way for a large gray iron foundry plant to be added to the machine shop of the Consolidated Press Co., Hastings, Mich. This will comprise a foundry and storage building 130 by 220 ft., a pattern building, 75 by 150 ft., and a small forge shop.

Wire Wheel Works Opens Coast Branches—The National Wire Wheel Works, Inc., Geneva, N. Y., has opened up service stations in San Francisco, Fresno and Los Angeles, Cal. This service will be handled by the Electric Equipment Co. Shortly service stations will be opened in Seattle and Spokane, Wash., and several other important coast cities.

Brass Foundry at Superior, Wis.—The Crescent Brass Foundry Co. has been organized at Superior, Wis., and opened a brass and bronze foundry. The owners are A. A. Williams, formerly of the Duluth Gas Engine Works, and Gustave B. Erickson, formerly of the Duluth Brass Works, Duluth, Minn. The new concern will make a general line of automotive and marine brass and bronze goods.

Huffman Installs Machinery—Extensive machinery equipment is being installed in the body-building plant of the W. F. Huffman Automobile Co., Omaha, Neb. This will bring the output capacity up to several hundred bodies per month. Complete milling and shaping machinery, modern forging equipment and a paint room is so arranged as to make progressive assembling and finishing possible.

Arizona Dealer Activities—The Phoenix Motor Co., of Phoenix, Ariz., has been made distributor for Studebaker cars and Sandusky farm tractors for Arizona. The Auto Consignment Co., of Phoenix, Ariz., has opened for business at 514 North Central Ave. The firm is composed of H. V. Bennet and C. E. Hutchler of Los Angeles, Cal. F. L. Hart, Second Ave. and Van Buren, Phoenix, Ariz., has opened a new garage.

Columbia Motors Makes Appointments—H. W. English, Spokane, Wash., has been made district sales manager of the Columbia Motor Truck & Trailer Co., Pontiac, Mich., for the Pacific Northwest. He has for the last few years been associated with the Republic Motor Truck Co. in that territory. E. H. Habersham, Baltimore, has been appointed district sales manager for Columbia in the Southern states east of the Mississippi river. A. H. Pearsall has been made district sales man-

ager, with headquarters at Chicago for Illinois, having formerly been branch manager of the Studebaker Corp. at Chicago.

Olympian Motors in Production—Olympian Motors Co. shipped its first car April 29. Production is now 10 cars a day, which is expected to grow to 15 daily within a week.

Riordan Leaves Grant Lees—J. M. Riordan has resigned as sales engineer of the Grant Lees Gear Co., Cleveland, which position he has held for the last three years, to become associated with the sales organization of the Cleveland Milling Machine Co.

Clough Now with Mason Tire—Lee Clough, formerly of the Firestone Tire Co., has been secured by the Mason Tire & Rubber Co. to take charge of the new solid tire department of the Mason factory at Kent, Ohio. Mr. Clough will assume his new duties at once.

Kanis with Chicago Concern—W. B. Kanis, former treasurer and general manager of the New Era Spring & Specialty Co., Grand Rapids, Mich., has been appointed sales representative of the Advance Automobile Accessories Corp., Chicago, for Michigan, Ohio and Indiana.

New Production Manager for Traffic Truck—Leopold E. Mosiman, formerly factory superintendent of the Chevrolet Motors Co., St. Louis, Mo., has resigned his position to associate himself with the Traffic Motor Truck Corp., St. Louis, Mo., in the capacity of production manager.

Baynes to Hubbard Spring—E. C. Baynes, formerly with the Hubbard Spring Mfg. Co., Pontiac, Mich., has been placed in charge of the Detroit sales office of the Parker Mfg. Co., Ann Arbor, Mich., manufacturer of high-speed drill chucks, arbors and special tools. The Parker company is now utilizing the entire plant formerly occupied by the Star Truck Co. and has equipped it throughout with tools and machinery.

Spokane Scene of Activities—At Spokane, Wash., several hundred motor car men are expected in July for the annual meeting of the Washington Automobile Chamber of Commerce. The association now has membership among dealers in practically every town in the state. The Spokane Automobile Chamber of Commerce has planned an interesting program. The opening day, July 27, will be given over to convention business, the meeting to be held at the Davenport Hotel. Spokane



TO TOUR UNITED STATES IN TRUCKS—Commander G. E. Ella, a wealthy retired officer of the Italian navy, now at Pinehurst, N. C., recently bought two Indiana trucks from the Carolina Motor Co., Statesville, N. C., and will tour the country, carrying supplies and camping equipment in the trucks

dealers will give a dinner with an educational program following that evening. A day at Hayden Lake is the program for July 28.

Smith Joins Federal Truck—R. Scott Smith, formerly district manager of the Federal Motor Truck Co., Detroit, has joined forces with the Standard Motor Truck Co., Detroit, as district representative.

Foundry Adds Storage—The National Bronze Aluminum Foundry Co., Cleveland, Ohio, has purchased a piece of land, 60 ft. by 35 ft., adjoining the foundry property, which will be used as a yard for storage.

Miner Represents Duplex Truck—Fred J. Miner has been appointed district representative of the Duplex Truck Co., Lansing, Mich. He was formerly with the Olds Motor Works, Lansing, Mich., and the Cadillac Motor Car Co., Detroit.

Melhuish Joins Fulton Truck—H. T. Melhuish, brother of William Fulton Melhuish, Jr., president, general manager and organizer of the Fulton Motor Truck Co., Farmingdale, Long Island, has been appointed advertising manager of the company. An extensive advertising campaign is being prepared in spite of the fact that the Fulton company has

tripled its production to take care of an increased volume of business.

Seifert Buys Strune Garage—H. R. Seifert, Ellsworth, Wis., has purchased the Strune Garage in East Ellsworth for \$4,000 and is remodeling and enlarging the storage rooms and repair shop.

Leverson Federal Plant Manager—Arthur C. Leverson, formerly vice-president of the H. L. & W. Sales & Mfg. Co., Detroit, has been appointed factory manager of the Federal Motor Truck Co., Detroit.

New Concern for Waupun, Wis.—The owners of the Portage Hotel Garage, Portage, Wis., have dissolved. Max steckel has purchased the interest of John J. Robinson and becomes the partner of Clarence L. York. The firm name now is York & Steckel.

Chalmers Distributing Point—A contract was recently signed between Adams-Cooper Auto Sales Co., Fort Smith, Ark., and the Chalmers Motor Car Co., providing for distribution of Chalmers cars over a wide section of Arkansas and Oklahoma.

Plan Factory Addition—The Cleveland Pneumatic Tool Co., Cleveland, Ohio, will erect a one-story addition and basement structure, 183 by 50 ft., to its plant, for machine shop purposes. To accommodate this building the company purchased ½ acre of land.

Gay with Johnston Company—Louis M. Gay, for twelve years head of the Consolidated Auto Top Co., Cleveland, Ohio, has joined the William R. Johnston Mfg. Co., maker of beveled plate glass curtain windows. He will be at the service of all manufacturers desiring advice on the designing and construction of tops.

Moon to Make 1000 Shells a Day—A \$2,000,000 order for large shells for the Army has been received by the Moon Motor Car Co., St. Louis, Mo., to be filled at the rate of 1000 shells a day. It is stated Moon shortly will add a \$600,000 plant to manufacture the shells. The manufacturing work will be done by the Moon company and the MacDonald Engineering Co., a subsidiary of Moon.

New Little Rock Motor Concerns—Work is being rushed on buildings for several Little Rock, Ark., motor concerns. Freeman & Freeman, Ford dealers, and Cook Johnson Auto Co., will soon be in their new homes. The Little Rock Battery Co., recently moved into its new building, Twelfth and Main street. The building to be used by Freeman & Freeman is 50 by 140 ft. A feature of the building is an electric elevator 10 by 18 ft., the largest of its kind in the state.



SOMETHING NEW FOR THE CAMPER—Here is a sanitary drinking cup and water filter combined for motorists in camping. The tube is of rubber, about 1½ ft. long, with absorbent cotton in the large end, through which water from the stream is filtered while drinking. When not in use the tube is rolled and placed in a container. The inventor is B. A. Stair, Los Angeles